DRAFT ENVIRONMENTAL IMPACT REPORT
ER 88-11

Beaconsfield Homes
17-Unit Single-Family Development
Beaconsfield Place

June, 1989

Steven D. Billington
Planning and Environmental Research
1226 Warner Court
Lafayette, CA 94549

File No. ER 88-11
Ref. No. TPM 5393

City of Oakland
Oakland, California

DRAFT ENVIRONMENTAL IMPACT REPORT FOR:

Beaconsfield Homes
(Project Name)

California Environmental Quality Act (CEQA)

SUMMARY

A. GENERAL INFORMATION

Project Title Beaconsfield Homes Residential Development

Location East end of Beaconsfield Place, south Montclair area, Oakland Hills

Project Sponsor ARTEK, Incorporated

ADDRESS 2231-A Commercial Ave., Concord, CA 94520

B. PROJECT DESCRIPTION

Resubdivision of two existing single-family residential lots into three single-family lots; construction of 17 single-family units on 14 existing lots and three resubdivided lots; construction of street improvements along approximately 530 feet of Beaconsfield Place public right-of-way; installation of appurtenant drainage and utility facilities. Existing residential lots are part of 1943 Piedmont Pines residential subdivision. Proposed street improvement would provide access to three existing residential lots in addition to the lots proposed for development.

C. SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE PROJECT

1. Significant Impacts and Potentially Significant Impacts

a. Beaconsfield Place Sewer Line

With the project's proposed roadway fill, the flow-line of the existing sewer in the Beaconsfield Place right-of-way would, in some locations, be about 20 feet below the surface of the new roadway. According to the City's Office of Public Works, such depth would not be acceptable due to potential maintenance problems.

b. Firefighting Water Pressure

The City of Oakland Fire Prevention Bureau has indicated that fire-hydrant water pressure in the project area may not be sufficient to meet required pressure standards for firefighting water supply.

c. Project Fire Hazards

The project site is in an official critical-fire-hazard area where additional development could increase the fire-hazard potential.

d. Roadway Characteristics of Existing Beaconsfield Place

The existing paved stretch of Beaconsfield Place has pavement width as narrow as 18 feet, has very-poor pavement quality along its lower area, approaching the project site, and appears to have failing pavement along the outside edge of the roadway between Chelton Drive and Keswick Court.

e. Keswick Court Sight Distance

At the Keswick Court approach to Beaconsfield Place, sight distance up Beaconsfield is limited by the sharp configuration of the intersection and the elevation of Beaconsfield above Keswick. With these conditions, the addition of project traffic will increase the potential for vehicle conflicts at the intersection.

f. Keswick "Driveway" Conditions

The driveway connecting the west end of Keswick Court and Chelton Drive is very narrow and has poor sight-distance at Chelton Drive. Use of this roadway by project traffic could result in unnecessary congestion and traffic hazards. (This route is not needed for regular access to Keswick Court and Beaconsfield Place.)

g. Project Parking

Because about one-half of the proposed units have driveways too short to accommodate parking of the largest passenger vehicles without overhanging the proposed street, and because of the tendency of single-family residents to use garages for storage rather than for parking, it is anticipated that project residents would regularly park on both sides of the proposed 30-foot street, thereby reducing travelway width to less than 20 feet and creating the potential for congestion and obstruction of emergency vehicles.

h. Construction Vehicle Traffic and Parking

The volume and sizes of construction vehicles which will be required for project development have the potential to cause significant traffic congestion and safety hazards along the roadway route and entrance to the site. At the site entrance, access and street area are limited, and it is anticipated that unless construction vehicles are otherwise accommodated, they will make excessive use of the Beaconsfield Place/Keswick Court intersection for parking and queueing. Excessive use of this area for vehicle and materials storage is also possible.

i. Construction Traffic Damage to Roadways

Heavy construction vehicles required for project development could cause damage to existing roadway improvements along the access route to the site.

j. Project Grading Plans

The applicant has not submitted a standard grading plan of the type which is normally required for new subdivisions. Instead, a number of separate plan sheets show the general grading concept in terms of retaining wall locations and roadway fill. No information is presented for sideyards or for lots which will not require retaining walls, and there are no details regarding earthwork around the roadway entrance to the site and the effect it would have on the adjacent property at 2639 Beaconsfield Place.

k. Earthwork and Retaining Walls

To generate fill material, excavation is proposed along the lower areas of steep slopes which show evidence of active mass wasting (erosion, soil slippage, and sloughing). This poses the potential for reducing the stability of a broad upslop area. The proposed solution is to construct tiered wood walls, up to six feet in height, at the rear of cut areas. The potential problem with wood walls is longevity. Eventually wood will rot and need to be replaced. It should also be recognized that the project's limited sideyard areas and steep sideyard slopes would make wall repair or replacement difficult.

The slope behind the proposed walls is steep (50% or greater) and up to 50 feet high, typically. The material to be retained consists of soil and rock that is severely weathered and fractured. Also, regular irrigation of landscaping around wood walls could have an adverse effect on the life of the wood.

l. Surface Drainage and Irrigation

Landscape irrigation could significantly raise groundwater levels at the project site, contributing to destabilization of cut slopes. Landscape irrigation in the project residential areas could cause either shallow or deep-seated slope movement.

m. Secondary Project Drainage System

The project submittal does not include complete plans for a secondary drainage system which will be needed to assure that runoff from residential lots is adequately collected and conveyed to the proposed roadway storm-drain system.

n. Maintenance of Private, Common Drainage Facilities

Because of the combination of steep project-site slopes and the proposed provision of common, privately-owned drainage facilities, the City must be assured that project residents will act collectively to provide long-term drainage-system maintenance and repairs in order to preclude runoff-related geologic and property-damage problems.

o. Trash Rack at Proposed Storm Drain Headwall

The proposed storm-drain headwall at the northeast corner of the project site could become obstructed by debris washed down the creek channel, possibly resulting in overflow and damage to downstream improvements.

p. Vegetation/Wildlife and Visual Characteristics

The project would result in major changes in the biological and visual nature of the site. Earthwork, street improvements, and house construction would eliminate about one-half of the site's existing vegetation community. This would alter the habitat structure of the site and reduce its wildlife value. The combination of vegetation removal, exposed earthwork, roadway improvement, and new houses would substantially change the visual character of the site as regularly viewed from surrounding residential vantage points.

2. Unavoidable Adverse Impacts

a. Major short- to long-term change in the site as a component of established neighborhood character.

b. Cumulative increase in peak runoff and siltation, and cumulative decrease in downstream water quality.

c. Cumulative decrease in vegetation types and wildlife populations.

d. Cumulative increase in traffic volumes.

e. Long-term, cumulative increase in air pollution; and short-term, periodic construction air pollution (dust, fumes).

f. Cumulative increase in energy consumption.

g. Cumulative increase in demand for services and community facilities.

h. Long-term, cumulative increase in project-area ambient noise levels; and short-term, periodic construction noise.

D. POSSIBLE MITIGATION MEASURES TO REDUCE SIGNIFICANT AND POTENTIALLY SIGNIFICANT IMPACTS OF THE PROPOSED PROJECT (Refer to Section C, above.)

a. Beaconsfield Place Sewer Line

Replace the existing sewer line with a new line at a shallower depth acceptable to the City's Office of Public Works.

b. Firefighting Water Pressure

Provide pressure-test results indicating adequate firefighting water pressure for the project site, or provide an alternative firefighting water-system design.

c. Project Fire Hazards

Provide fire hydrants in accordance with requirements of the Fire Marshall; provide fire-retardant roof covering; install fire sprinklers in each house, along with "hard-wired" smoke detectors.

d. Roadway Characteristics of Existing Beaconsfield Place

The lower area of Beaconsfield Place, at the west site boundary, should be repaved when the project street is constructed. The Public Works staff should determine the extent to which Beaconsfield Place between Chelton Drive and Keswick Court should be improved, with regard to both additional pavement width and any repairs needed to correct apparent settling of the roadway pavement along the outside edge of the downhill lane.

e. Keswick Court Sight Distance

Install a stop sign and painted stop-bar at the Keswick approach to the intersection.

f. Keswick "Driveway" Conditions

Preclude or limit through traffic by making the route one-way-only, eastbound; or by installing removable barriers to preclude all traffic except emergency vehicles, between the west end of Keswick Court and a point east of driveways at the west end of the route.

g. Project Parking

Consider design alternatives to provide minimum 20-foot-long driveways; or to provide minimum 18-foot-long driveways and roll-up-type garage doors rather than overhead hinged doors; or to provide a 24-foot-wide street with eight-foot-deep parallel parking bays on both sides of the street.

h. Construction Vehicle Traffic and Parking

Prepare and implement a construction-traffic management plan which would limit parking and traffic congestion, and reduce safety hazards (see discussion in text of EIR).

i. Construction Traffic Damage to Roadways

Before construction begins, provide a study of roadway-improvement conditions along the route to the site; and provide a bond or other assurance, consistent with normal City practice, to assure availability of funding for any repairs needed as a result of project construction traffic.

j. Project Grading Plans

The grading plan should be consistent with all subdivision grading-plan requirements of the City, and should be reviewed by the applicant's geotechnical engineer, to provide assurance that proposed earthwork is consistent with the recommendations of the applicant's 1988 and 1989 Alan Kropp & Associates geotechnical reports. Grading for lots where upslope retaining walls are not proposed should avoid cut slopes at the rear of the lots unless specifically approved by the geotechnical consultant. The grading plan should include details of earthwork in areas abutting the existing developed lot at 2639 Beaconsfield Place, at the west boundary of the project site.

k. Earthwork and Retaining Walls

Permanent walls (concrete) are preferable to wood walls. Wood posts should be avoided, whatever the design of the walls. Instead, concrete columns that are imbedded well into competent rock and heavily reinforced with rebar are recommended. The spacing of posts, depth of concrete piers, and diameter and number of steel rebars should take into account the adverse geologic conditions. The design should also carefully take into account the type and lengths of lagging. Concrete lagging is preferable to wood boards. If pressure-treated lagging is used, the spacing of columns should be arranged so that board ends are butted behind posts, rather than cutting the boards to new lengths and exposing the interior wood.

It is crucial that the grading code be carefully implemented, that the wall not be under-designed, and that all grading procedures be accurately documented to assure the highest quality of performance. The geotechnical and structural engineers' calculations for the walls should be critically reviewed by the City. The grading permit should specify that the applicant will submit a grading-completion report that will contain a detailed, as-graded plan, signed by the geotechnical engineer and engineering geologist.

l. Surface Drainage and Irrigation

Provide residential-lot drainage in conformance with the recommendations of the applicant's geotechnical reports by Alan Kropp & Associates; emphasize drought-tolerant species in landscaping; and provide a drainage-system scheduled-maintenance plan for homeowners.

m. Secondary Project Drainage System

Provide a complete secondary-drainage-system plan. Runoff collected from the rear yards of lots and from roof gutters should be conveyed in a closed system to the proposed roadway storm drain.

n. Maintenance of Private, Common Drainage Facilities

The applicant should propose a system for assuring long-term maintenance of common drainage facilities associated with the proposed retaining walls, and any other common facilities, to be permanently binding on project property owners.

o. Trash Rack at Proposed Storm Drain Headwall

Final drainage-system plans should include a trash rack (debris collector) designed in accordance with City requirements.

p. Vegetation/Wildlife and Visual Characteristics

Provide natural-appearing finish materials and earth-tone colors for houses. Avoid subdivision of the two lots at the southeast corner of the site into three lots. Provide a detailed vegetation and landscaping plan addressed to methods of minimizing project-site vegetation removal, maintaining functional areas of wildlife habitat, and providing planting to optimize long- and intermediate-term visual screening, within the constraints of overall site development.

E. AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED

Willie Yee, Jr.; Elois Thornton, Planning Department, City of Oakland

Moran Engineering, project engineers

Public Works Office, City of Oakland, Engineering Services and Traffic Divisions

Police Department, City of Oakland, Planning Division

East Bay Municipal Utility District, Engineering and Water Service Planning Depts.

Fire Department, City of Oakland, Fire Protection Bureau and Engines 24 and 25

Oakland Public Schools, Administrative Offices and Joaquin Miller School

Edward Franzen, Consulting Traffic/Civil Engineer, Concord

Darwin Myers, Engineering Geologist, Darwin Myers Associates, Martinez

Larry Seeman Associates, Pt. Richmond

Edward L. Pack Associates, Inc., Acoustical Engineers, Sunnyvale

F. PUBLIC AGENCIES HAVING JURISDICTION BY LAW OVER THE PROJECT

State of California (California Environmental Quality Act)

City of Oakland (Lead Agency; approval agency)

G. DRAFT EIR PREPARED BY:

Steven D. Billington
Planning and Environmental Research
1226 Warner Court
Lafayette, CA 94549

H. DATE COMPLETED:

June 7, 1989

CONTENTS

I.

PROJECT DESCRIPTION

A. INTRODUCTION

ARTEK, Incorporated, the project applicant, proposes the construction of street improvements and 17 houses along the remaining unimproved portion of Beaconsfield Place. Because the new street would be on existing public right-of-way and most of the houses would be on existing residential lots, the project does not require an application for approval of a Tentative Map (the required application for new subdivisions with more than four lots). However, the project has required an application for a grading permit (required for more than 50 cubic yards of earthwork) and an application for approval of a Parcel Map (the required application for new subdivisions of four or fewer lots) to divide two existing lots into three lots. Parcel Map applications are reviewed by the City staff and are approved or denied under the authority of the Planning Director. Staff decisions regarding Parcel Map applications may be appealed to the Planning Commission.

Under the provisions of the California Environmental Quality Act (CEQA), the City must determine, for each development application submitted, whether the proposed activity is exempt from CEQA and City environmental review requirements, or will require an Environmental Impact Report (EIR) or other environmental review. Based on review of project plans, the City determined that the proposed development is not exempt from environmental review, and prepared an Initial Study. The Initial Study indicated that the proposed level of development could have significant environmental impacts and, therefore, that an EIR would be required for the project. (The City's Initial Study is contained in Appendix A.)

B. SITE DESCRIPTION (Figs. 1-4)

Physical Characteristics. The project site is an undeveloped, east-west-trending canyon located between Ascot Drive and Chelton Drive, in the south Montclair District of the Oakland Hills area, approximately one-half mile east of the Warren Freeway. The floor of the westward-draining canyon is a rough, dirt roadway. Above the canyon floor, generally-uniform slopes, on the order of 40-60% slope (40-60 feet vertical/100 feet horizontal) rise to the ridges above the site, to the north, east, and south. Terrain at the easterly, upper end of the canyon is characterized by two natural drainage courses which descend from the northeast and southwest, and converge at the easterly end of the canyon floor. Overall physical relief on the project site is about 170 feet, with sea-level elevations ranging from approximately 950 feet at the westerly floor of the canyon, at the west site boundary, to approximately 1,120 feet near the ridgeline at the southeasterly corner of the site. To the north, Chelton Drive is on the order of 100 feet above the site's canyon floor; to the south, Ascot Drive/Ascot Court is on the order of 150 feet above the canyon floor.

The ridgeline perimeter of the site consists of developed residential lots which front Chelton Drive, Longcroft Drive, and Ascot Drive/Ascot Court, to the north, east, and south, respectively. Development nearest the project site is a single dwelling unit at 2639 Beaconsfield Place, a lot which abuts the westerly site

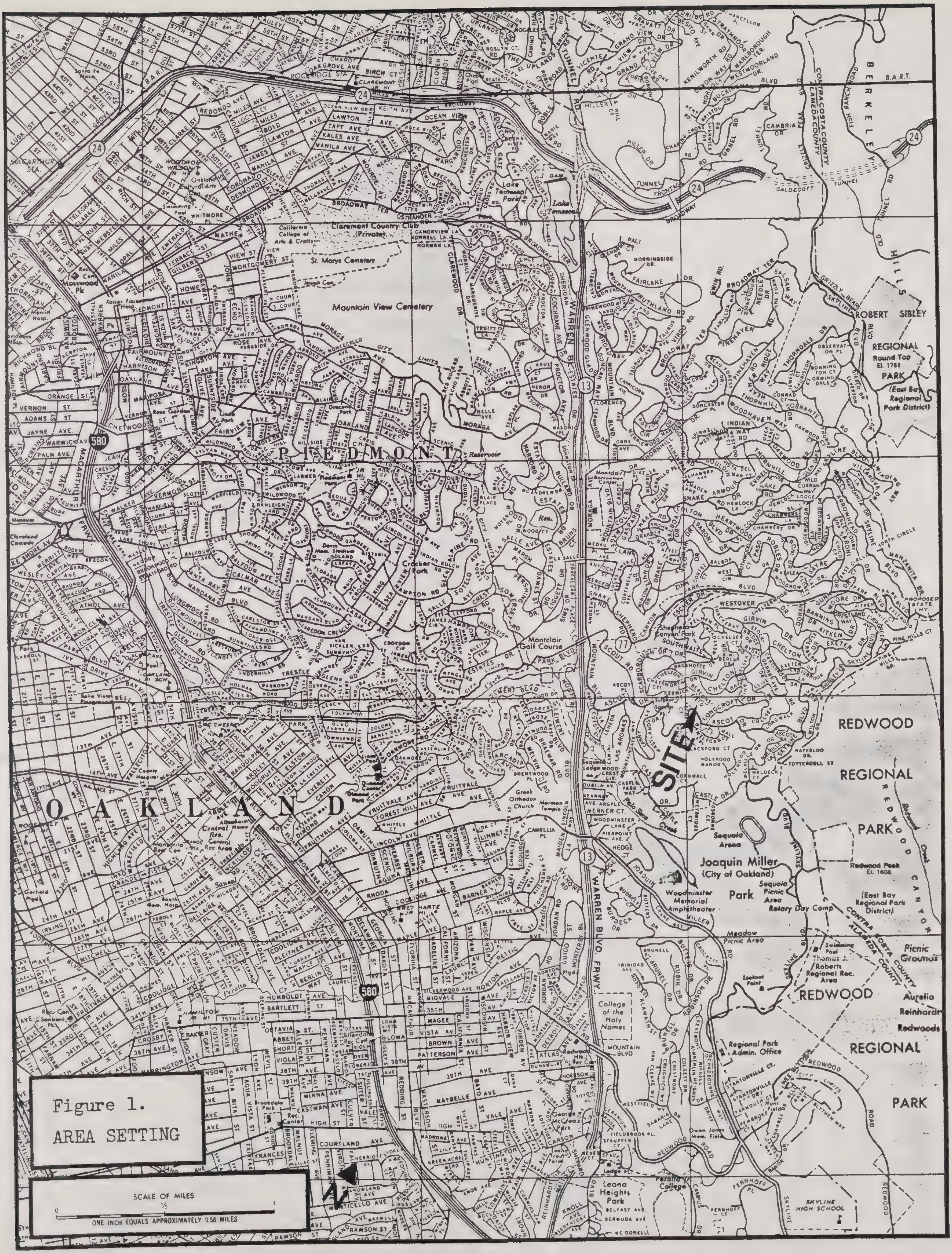


Figure 1.
AREA SETTING

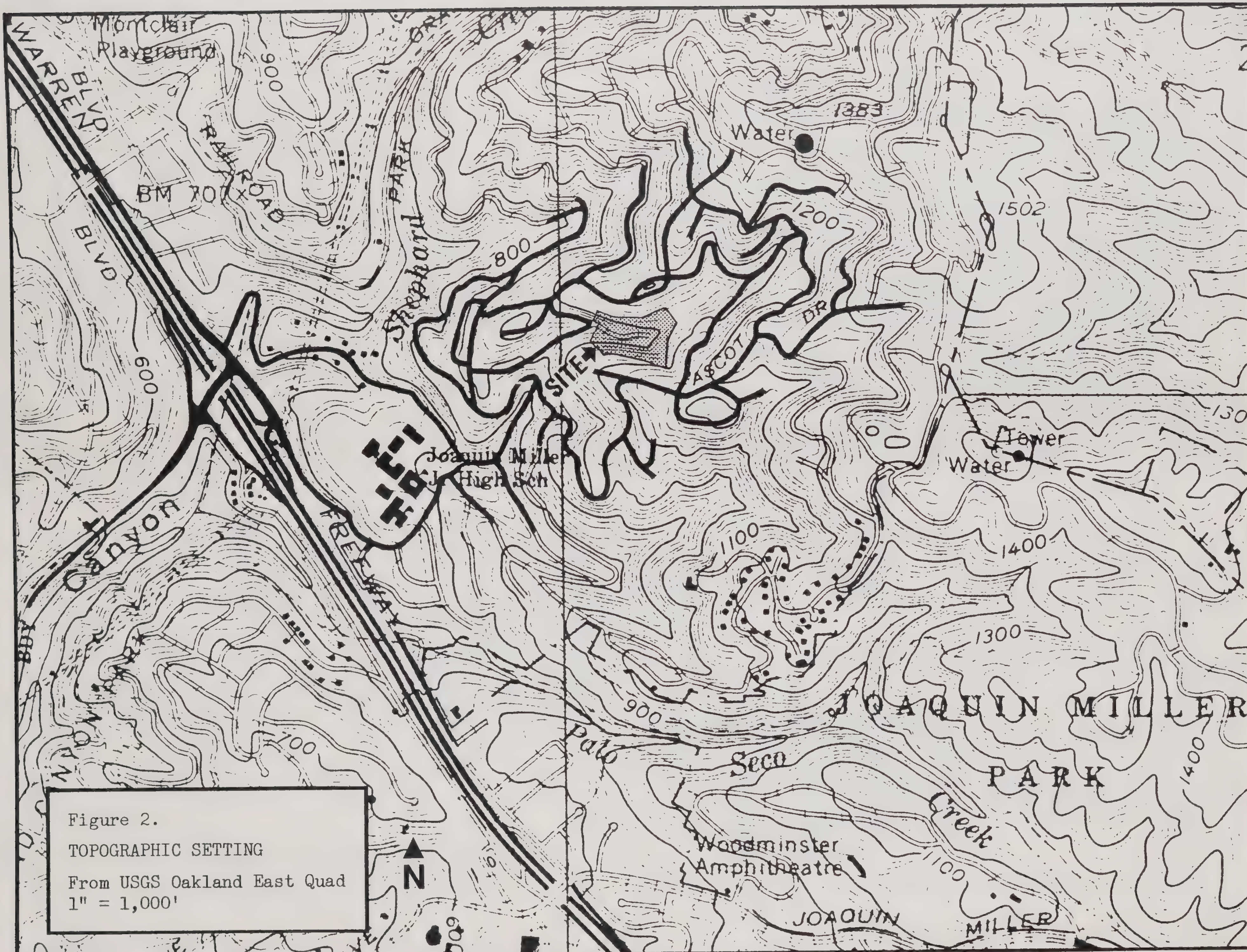


Figure 2.

TOPOGRAPHIC SETTING

From USGS Oakland East Quad
1" = 1,000'

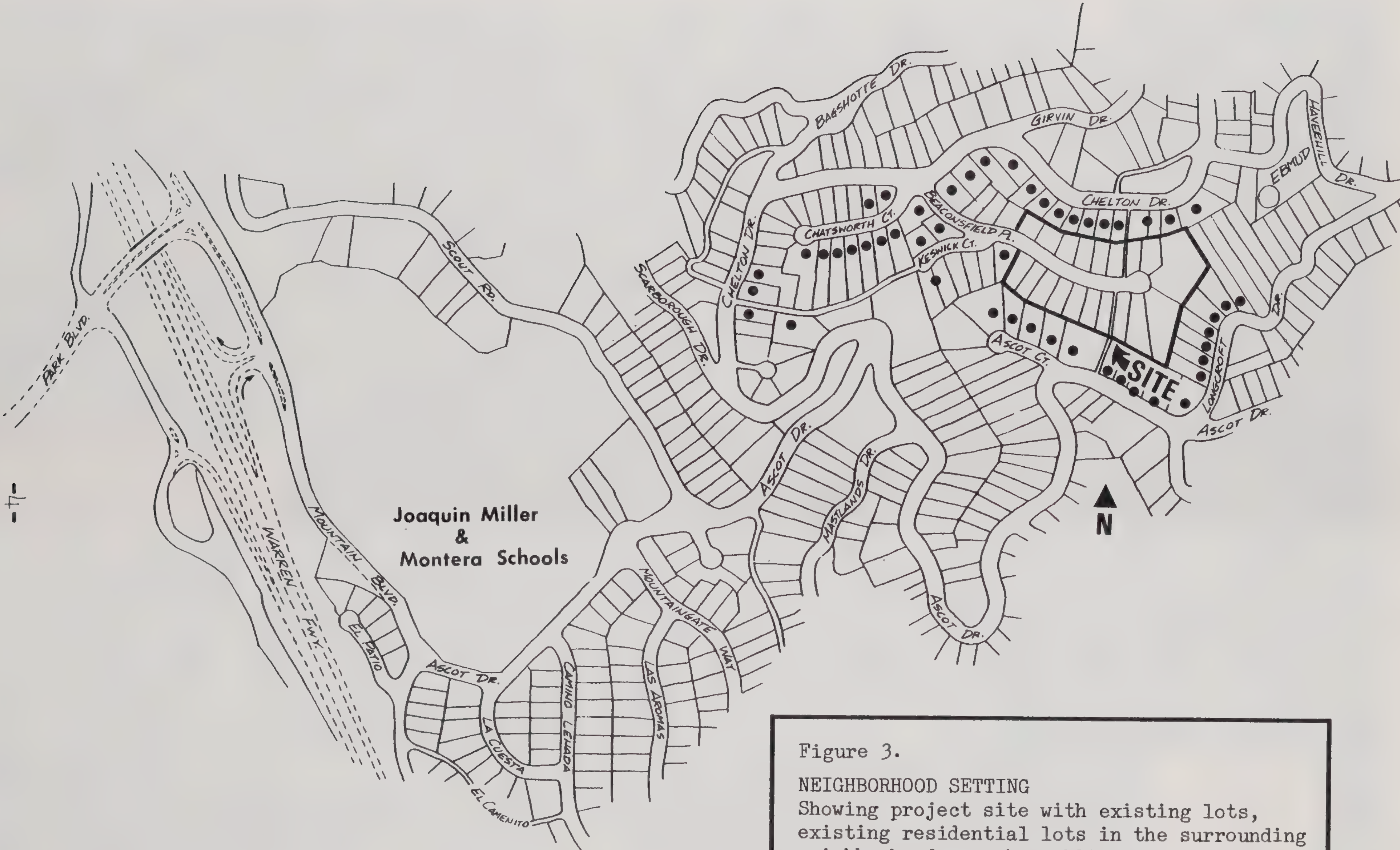


Figure 3.

NEIGHBORHOOD SETTING
Showing project site with existing lots, existing residential lots in the surrounding neighborhood, nearby public schools site, Warren Freeway, and public-road right-of-way serving the project area.

Scale: 1" = 500'

● = Developed parcels along the project-site boundary and nearby roadways.

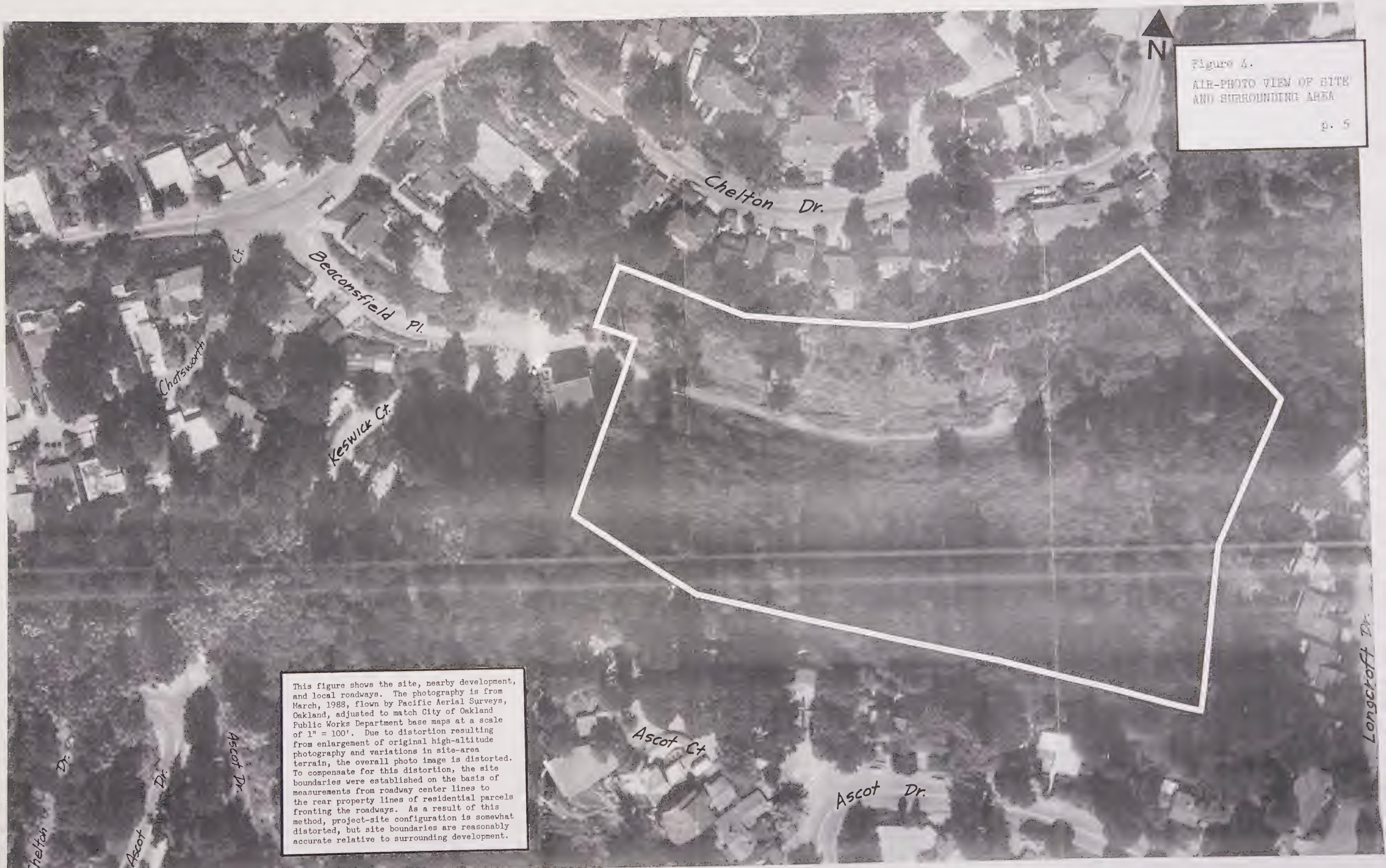


Figure 4.
AIR-PHOTO VIEW OF SITE AND SURROUNDING AREA

p. 5

This figure shows the site, nearby development, and local roadways. The photography is from March, 1988, flown by Pacific Aerial Surveys, Oakland, adjusted to match City of Oakland Public Works Department base maps at a scale of 1" = 100'. Due to distortion resulting from enlargement of original high-altitude photography and variations in site-area terrain, the overall photo image is distorted. To compensate for this distortion, the site boundaries were established on the basis of measurements from roadway center lines to the rear property lines of residential parcels fronting the roadways. As a result of this method, project-site configuration is somewhat distorted, but site boundaries are reasonably accurate relative to surrounding development.

boundary, on the south side of the street, at the project entrance. Primary project-site access is southeastward down Beaconsfield Place, from its intersection with Chelton Drive and Chatsworth Court. Access is also available from Chelton Drive southwest of the site, eastward along Keswick (driveway) to Keswick Court, to the intersection of Keswick Court and Beaconsfield Place, at the westerly site boundary. The Keswick driveway is a public right-of-way, with one-lane pavement, between Chelton Drive and the west end of Keswick Court. The canyon in which Keswick Court is located is the west end of the project-site canyon. Beyond the west end of Keswick Court, this canyon drains southwest, along lower Ascot Drive.

Along the north side of the site's canyon floor, there is a ditch containing a broken, 24-inch corrugated metal pipe, which extends from the east, upper end of the canyon floor to a storm-drain inlet at the west site boundary.

Existing Lots and Right-of-Way. The area of the project site (including lots which would be vacant after completion of the proposed development) consists of 19 recorded residential lots and approximately 530 feet of 50-foot-wide public right-of-way which comprises the easterly end of Beaconsfield Place. Near the east end of the site, 10-foot-wide, undeveloped public-path right-of-way connects both Ascot Drive and Chelton Drive with the Beaconsfield Place right-of-way. Based on map measurements, the project-site's lots, recorded in 1943 as part of Piedmont Pines area subdivision, range in area from about 5,700 sq. ft. (0.13 acre) to about 29,500 sq. ft. (0.68 acre). The three largest lots, about 14,200, 23,600, and 29,500 sq. ft., are located at the east boundary of the site, at the end of the cul-de-sac right-of-way. The 16 remaining lots, along the north and south sides of the right-of-way, have fairly uniform area, within a range of about 6,200 to 9,200 sq. ft. The site's lot sizes are generally consistent with the sizes of developed lots in the surrounding area, which were also part of original Piedmont Pines subdivision.

The project-site's total net area (area outside of public right-of-way) is approximately 4.2 acres. Thus, with 19 existing lots developed, density would be about 0.22 acre/unit (about 9,600 sq. ft./unit, average).

C. PROPOSED DEVELOPMENT (Figs. 5-14)

Construction of a New Street along the Beaconsfield Place Right-of-Way. This street would have cement-concrete curbs and gutters (no sidewalks proposed), 30 feet of pavement width, and a 30-foot-radius turnaround area at the end of the cul-de-sac. Maximum roadway gradient would be 18% along a stretch of about 150 feet at the west end of the site; the easterly half of the roadway would have about 7.5% grade, except for the turnaround area, which would be nearly level.

To accommodate street and house-foundation construction, approximately 12,000 cubic yards of earth would be excavated from both lower slopes of the canyon and would be placed in the canyon floor. At the west end of the site, the fill would match the grade of the existing end-of-pavement of Beaconsfield Place. On-site, the fill would taper up to nearly 20 feet of depth near the east end of the right-of-way. Balanced grading is proposed (no earth hauled to or from the site). The lowest dwelling-unit foundations would be placed on earthwork cuts approximately at the elevations of the new roadway pavement. Second- and third-floor levels of

Right-of-way width = 50 ft.
Street width = 30 ft.

SS = Sanitary sewer
MH = Manhole
LH = Lamphole (clean-out)
SD = Storm drain
DI = Drop inlet (storm drain inlet)

Names on houses refer to architectural designs. For elevations, see Figures 9 and 10-14.

Details of proposed subdivision of two lots into three lots, at southeast corner of site, are shown on Figure 8.

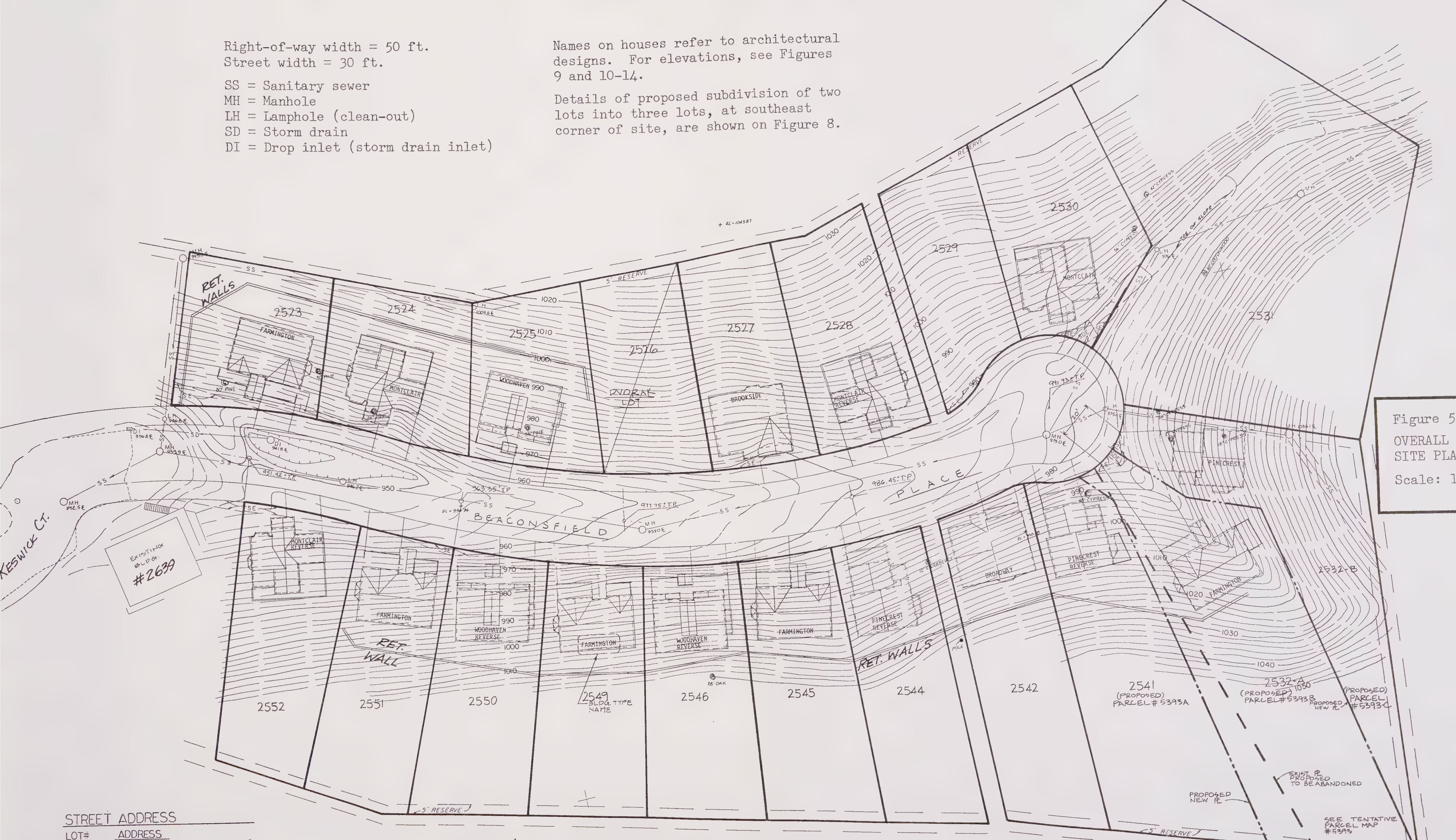


Figure 5.
OVERALL SITE PLAN
Scale: 1" = 50'

STREET ADDRESS

LOT#	ADDRESS
2523	2644 BEACONSFIELD PLACE
2552	2645
2524	2650
2551	2651
2550	2655
2525	2656
2549	2661
2526	2662
2546	2665
2527	2668
2545	2669
2544	2673
2528	2674
2542	2677
2529	2682
5393-A (FORMER 2541/2532)	2683
5393-B " "	2685
5393-C " "	2687
2530	2688

N -180
-90 E
W 90°
0° S

CONVENTION FOR BUILDING AXIS OF ROTATION BASED ON MICROPAS II, TITLE 24 ENERGY ANALYSIS AS PERFORMED BY:
HENRY MEYER AND ASSOCIATES
ENERGY & MANAGEMENT CONSULTANTS

OVERALL SITE PLAN NOTES

1. SEE DWGS. A1.2 → A1.5 FOR DETAILED SITE PLANS
2. ALL SPOT GRADES SHOWN ARE NEW OR EXISTING EARTH GRADES UNLESS NOTED OTHERWISE (SUCH AS "T.P." OR "SLAB" ETC.)
3. BLDGS. SHOWN ON THIS PLAN SHOWN FROM ROOF PLAN VIEW.
4. ALL DRIVEWAY WIDTHS ARE 19'-4" U.O.N.

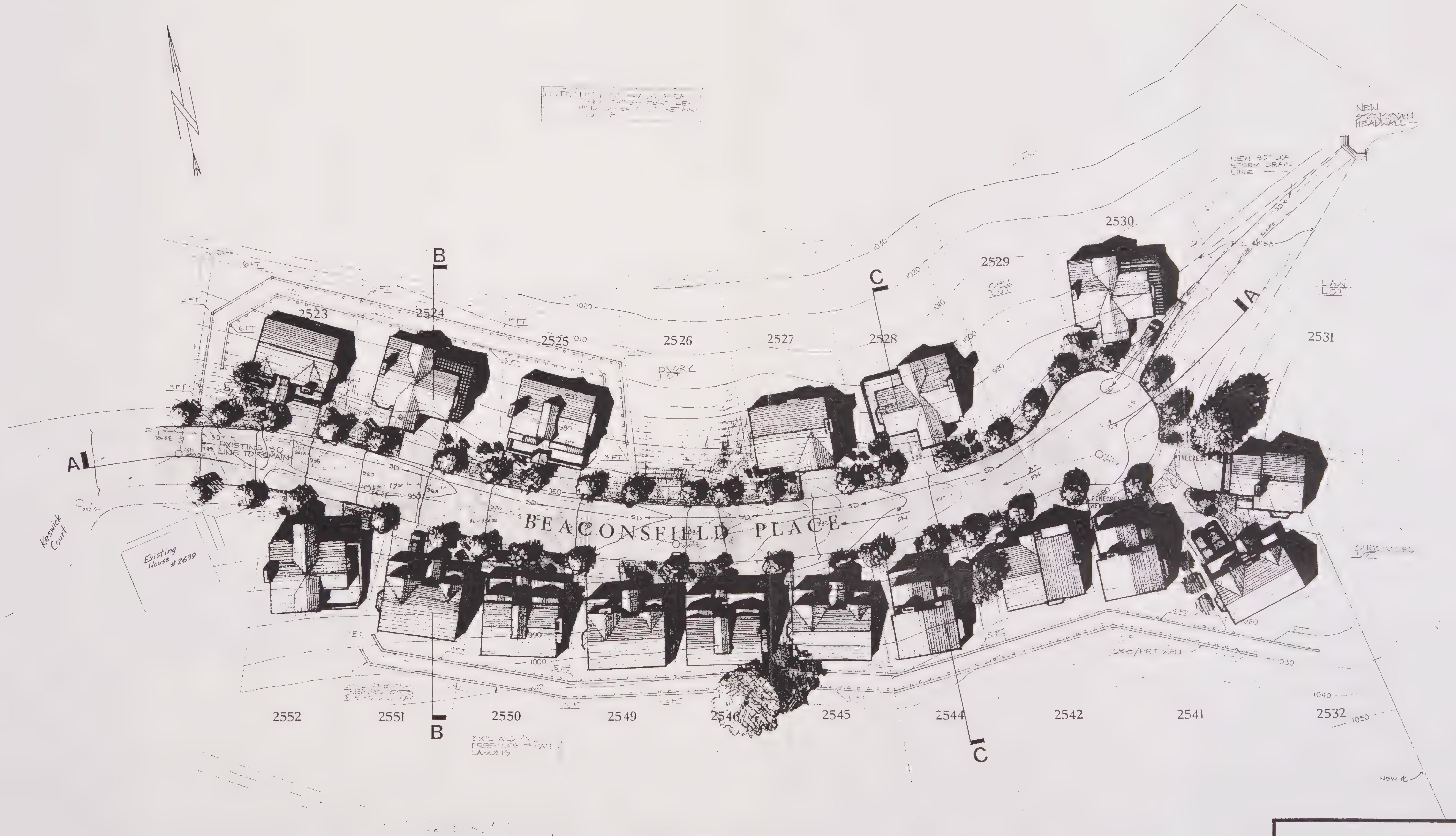


Figure 6. DEVELOPMENT SITE PLAN

Profile A and sections B and C are shown on Figure 7. Parcels 2526, 2529, and 2531 are not part of the project, and would be developed individually.

Scale: 1" = 50'

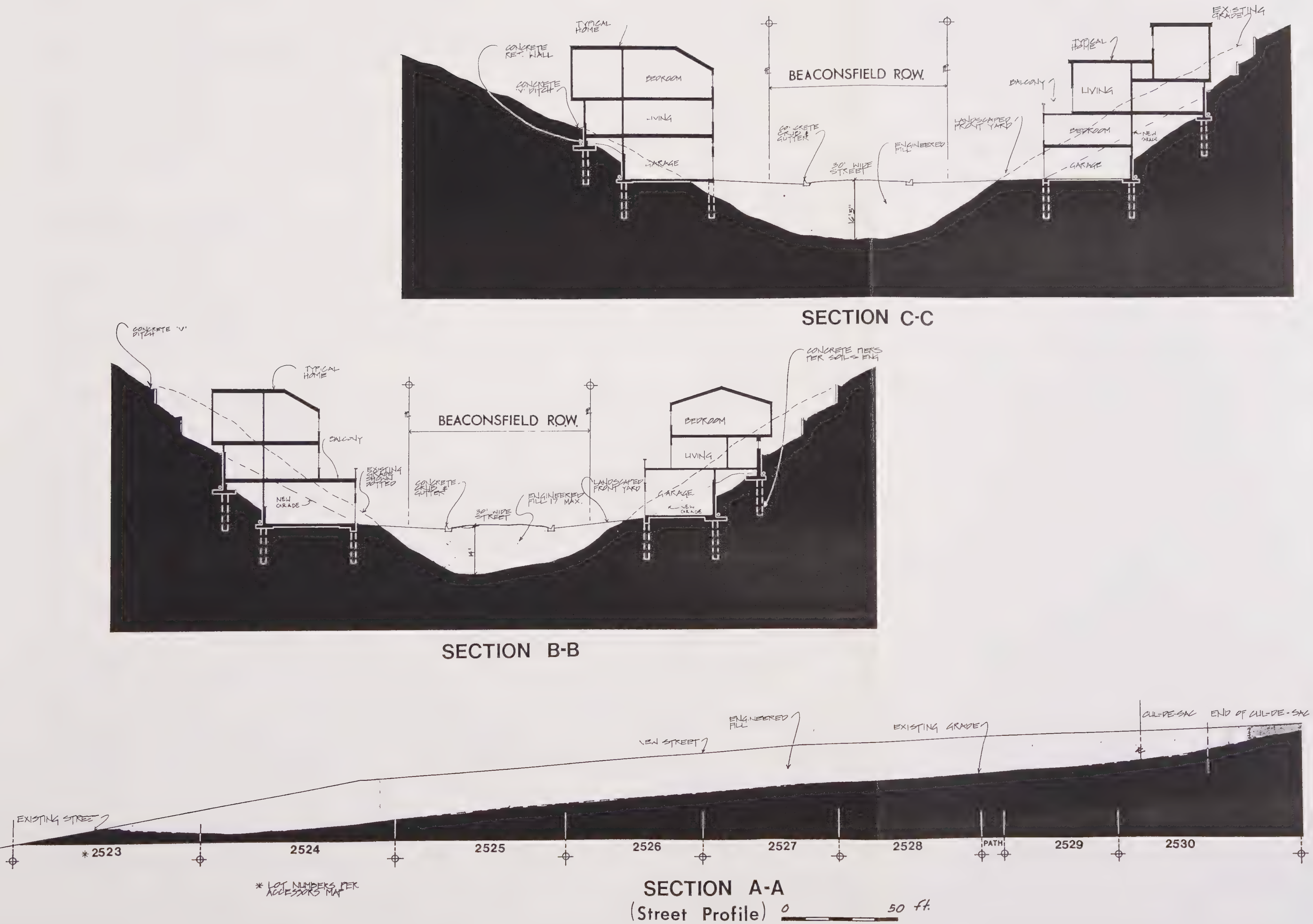


Figure 7.

SECTIONS AND STREET PROFILE
Showing proposed cuts and fill, sample house siting and foundations, and upslope retaining walls.

B-B & C-C scale: 1" = 30'

(Section and profile locations shown on Figure 6.)

units would be stepped upslope within the excavated areas at the bottoms of the canyon slopes. Pairs of closely-spaces wood retaining walls, up to about five or six feet in height, would be placed behind 12 of the proposed 17 units, to support the cut slopes above the excavated areas.

Construction of New Drainage and Utility Facilities. Proposed development includes new utility and drainage facilities in the new project street. Drainage facilities would include a new storm drain to replace the existing, damaged pipe in the canyon floor, and a new subsurface pipe and headwall to collect runoff in the stream channel which enters the northeast corner of the site (Fig. 5). The City's Public Works Department has indicated that the existing sewer line under the Beaconsfield right-of-way, which would be covered to a depth of nearly 20 feet with the proposed roadway fill, should be replaced with a new line at a maximum depth of six feet.

Subdivision of Two Existing Lots into Three New Lots (Fig. 8). The applicant has submitted a Tentative Parcel Map application which, if approved, would result in a new project-site lot at the southeast corner of the site. The existing property line between Lot 2532 (0.54 acre) and Lot 2541 (0.33 acre) would be eliminated and two new interior property lines would be created, resulting in three lots, with areas of 0.26, 0.37, and 0.24 acre. With this subdivision, the project site would have a total of 20 lots. With project-site net area of about 4.2 acres, ultimate 20-lot development density would be about 0.21 acre/lot (about 9,150 sq. ft./unit).

Construction of 17 Houses. Submitted plans call for the creation of one new project-site lot, as described above, and the construction of 17 houses. Fourteen of the houses would be built on existing lots, one each would be built on the three new lots at the southeast corner of the site, and three existing lots (Lots 2526, 2529, and 2531; Fig. 6) would remain vacant, to be developed in the future. The three lots which would remain vacant are not controlled by the applicant, but it is understood from the applicant that the owners do not object to the project. (It is recommended, however, that the City consider the potential for property-damage liability with regard to the three parcels, and make whatever requirements are necessary to preclude City liability.)

Development Phasing. Although the applicant does not have a detailed phasing plan, it is proposed that the project be developed in three phases to be conducted over a period of several years, possibly three to five years. The first phase would include all of the basic project improvements--major earthwork, construction of retaining walls, installation of major drainage facilities and utilities, construction of the project street, and rough lot-grading; and the construction of four to six houses. The second and third phases would each include the construction of four to six houses. The house-construction phases are proposed to be "random," rather than in any specific site-plan pattern, such as phased progression along the project street. It is anticipated that first-phase improvement would occur during the first construction season following project approval.

House Designs. The terrain of the project site, with relatively-uniform, steep slopes and canyon-floor access, has resulted in a development plan with fairly consistent, shallow building sites, with house siting on most of the lots limited

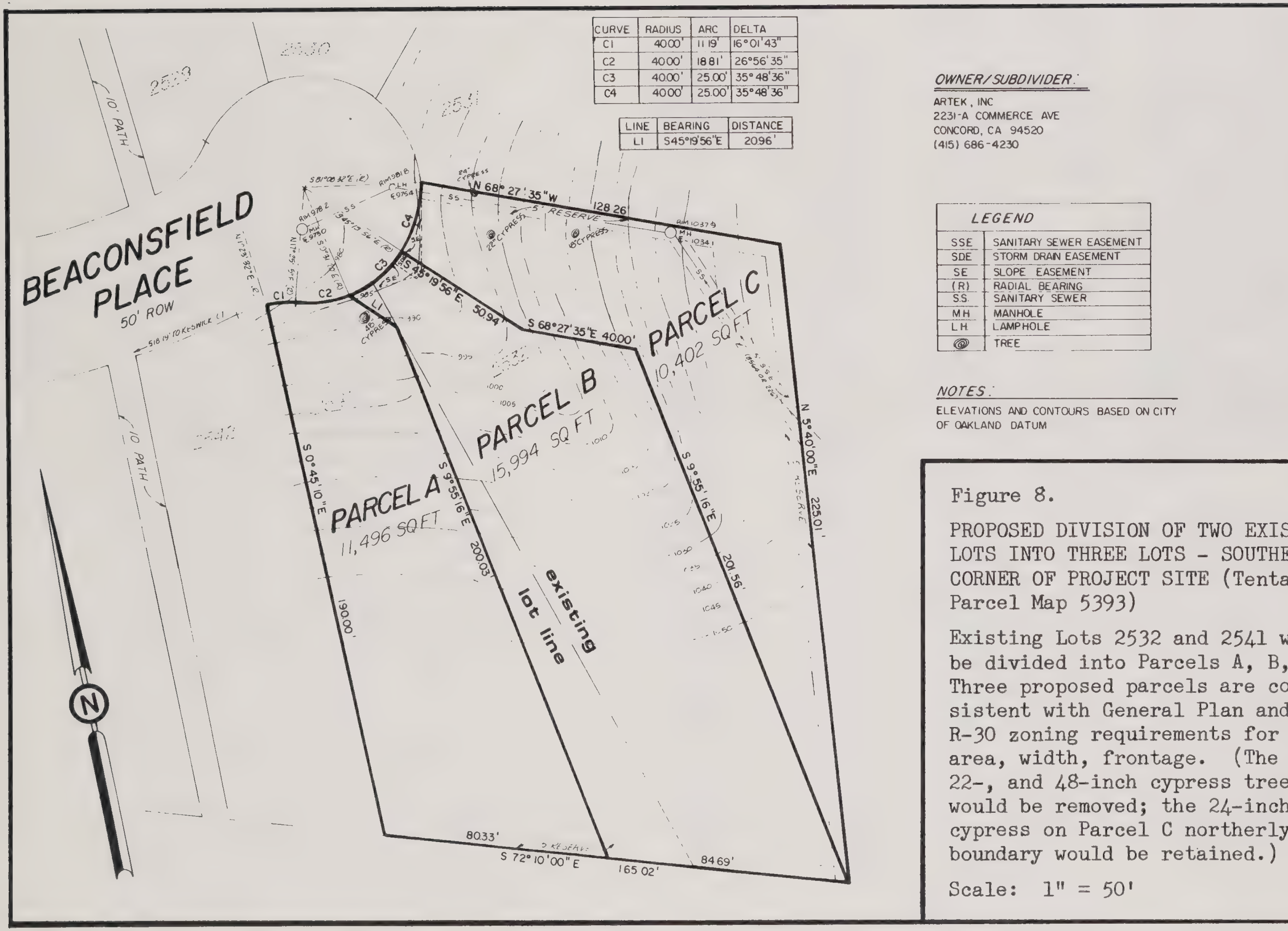


Figure 8.

PROPOSED DIVISION OF TWO EXISTING LOTS INTO THREE LOTS - SOUTHEAST CORNER OF PROJECT SITE (Tentative Parcel Map 5393)

Existing Lots 2532 and 2541 would be divided into Parcels A, B, C. Three proposed parcels are consistent with General Plan and R-30 zoning requirements for lot area, width, frontage. (The 18-, 22-, and 48-inch cypress trees would be removed; the 24-inch cypress on Parcel C northerly boundary would be retained.)

Scale: 1" = 50'

by requirements for direct street-frontage access and back-yard retaing walls. These restrictions have been accommodated with six basic house designs for upslope, split-level units, with a range of two to four stories, including first-floor garages. Variation in house design would be provided by a combination of the six basic plans, some reversed floor plans, the relative distribution of the basic plans throughout the site, and contrasts in finish materials, colors, and perhaps in design details. Overall, the project architecture reflects a moderate range of traditional to contemporary forms, including peaked and shed roofs, and emphasis on fenestration (variety of window forms) and articulation (variety in form; porticos, eaves, decks, variable roof lines, etc.).

II. GENERAL PLAN AND ZONING

A. GENERAL PLAN

The project site and surrounding area are designated for single-family residential land use, with minimum 5,000 square-foot lots required for new developments.

B. ZONING

The project site is in the R-30 One-Family Residential Zone, which has a minimum-lot-size requirement of 5,000 square feet. Minimum required lot width is 45 feet and minimum required street frontage is 25 feet.

C. PROJECT CONSISTENCY

The proposed project is consistent with the site's General Plan land-use designation. All existing project-site lots, and the three new lots proposed at the southeast corner of the site, are consistent with the zoning district's lot area and lot dimension requirements.

STREET ELEVATION - LOOKING SOUTH

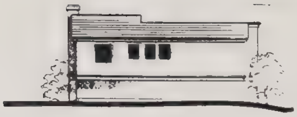
Figure 9.

PROJECT STREET ELEVATIONS
Showing proposed house designs and lot numbers.

Individual house elevations are shown on Figures 10-14.

STREET ELEVATION - LOOKING NORTH

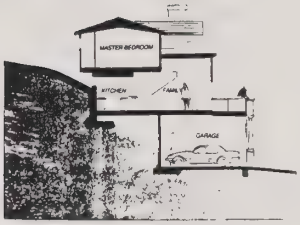
0 2 10 20 40



REAR ELEVATION

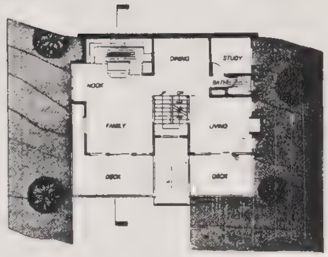
LEFT SIDE ELEVATION

THIRD LEVEL FLOOR PLAN



BUILDING CROSS SECTION

RIGHT SIDE ELEVATION



SECOND LEVEL FLOOR PLAN

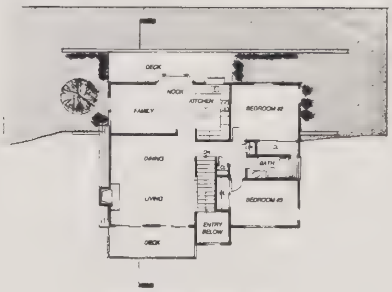
WOODHAVEN

FRONT ELEVATION

GROUND LEVEL FLOOR PLAN/SITE PLAN

REAR ELEVATION

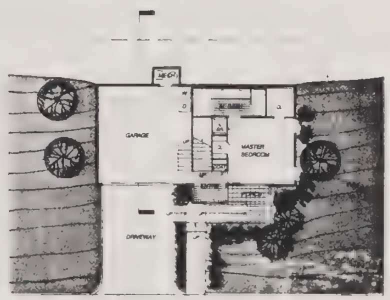
FRONT ELEVATION



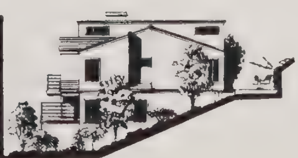
SECOND LEVEL FLOOR PLAN

BUILDING CROSS SECTION

LEFT SIDE ELEVATION



GROUND LEVEL FLOOR PLAN/SITE PLAN



RIGHT SIDE ELEVATION

Figure 10.

UNIT PLANS/ELEVATIONS - WOODHAVEN AND BROADWAY DESIGNS

For site locations, see Figures 5, 6, & 9. .

BROADWAY

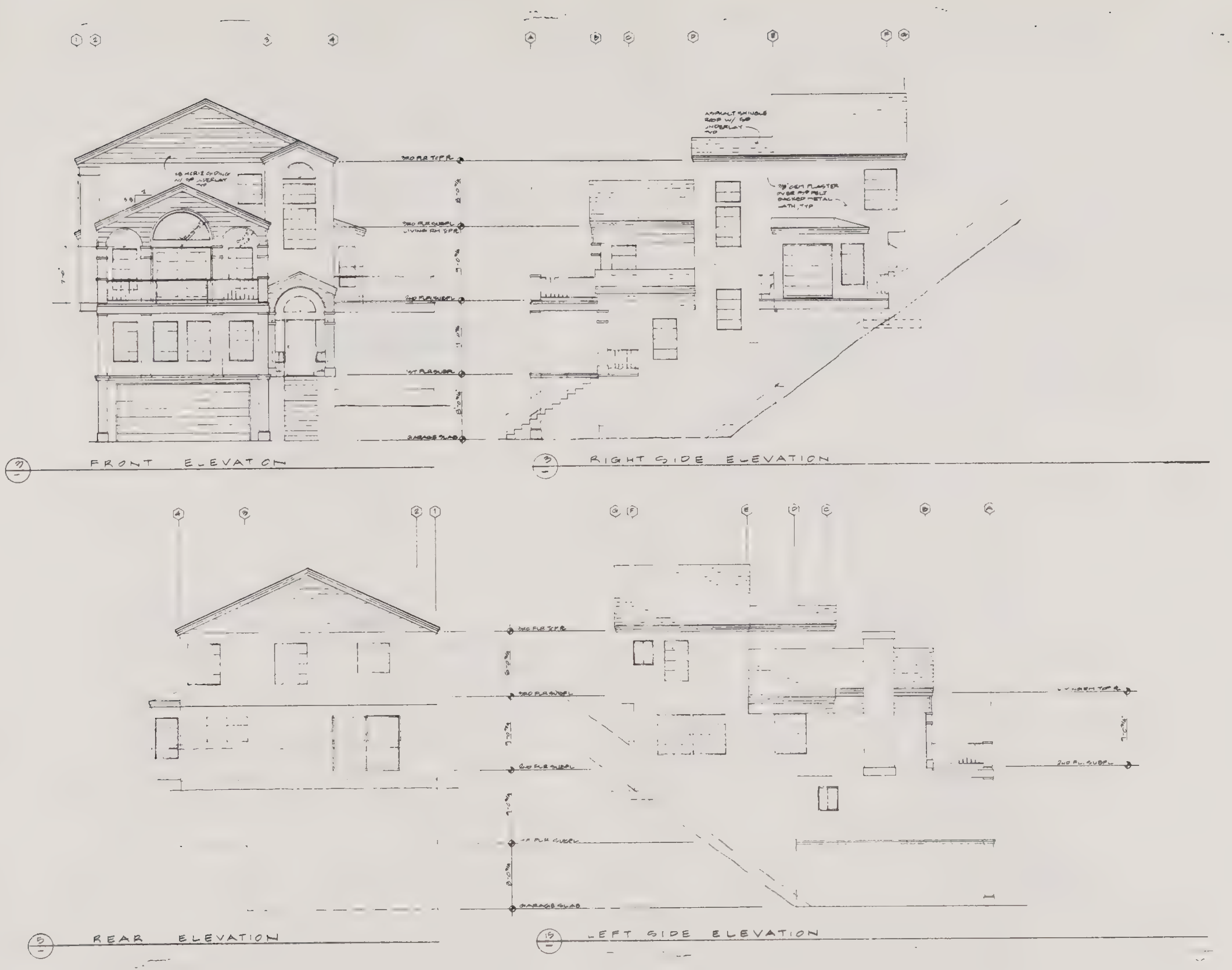


Figure 11.

UNIT ELEVATIONS - THORNDALE (PINECREST) DESIGN

Approx. reduced scale: 1" = 20'

For site locations, see Figures 5, 6, & 9.

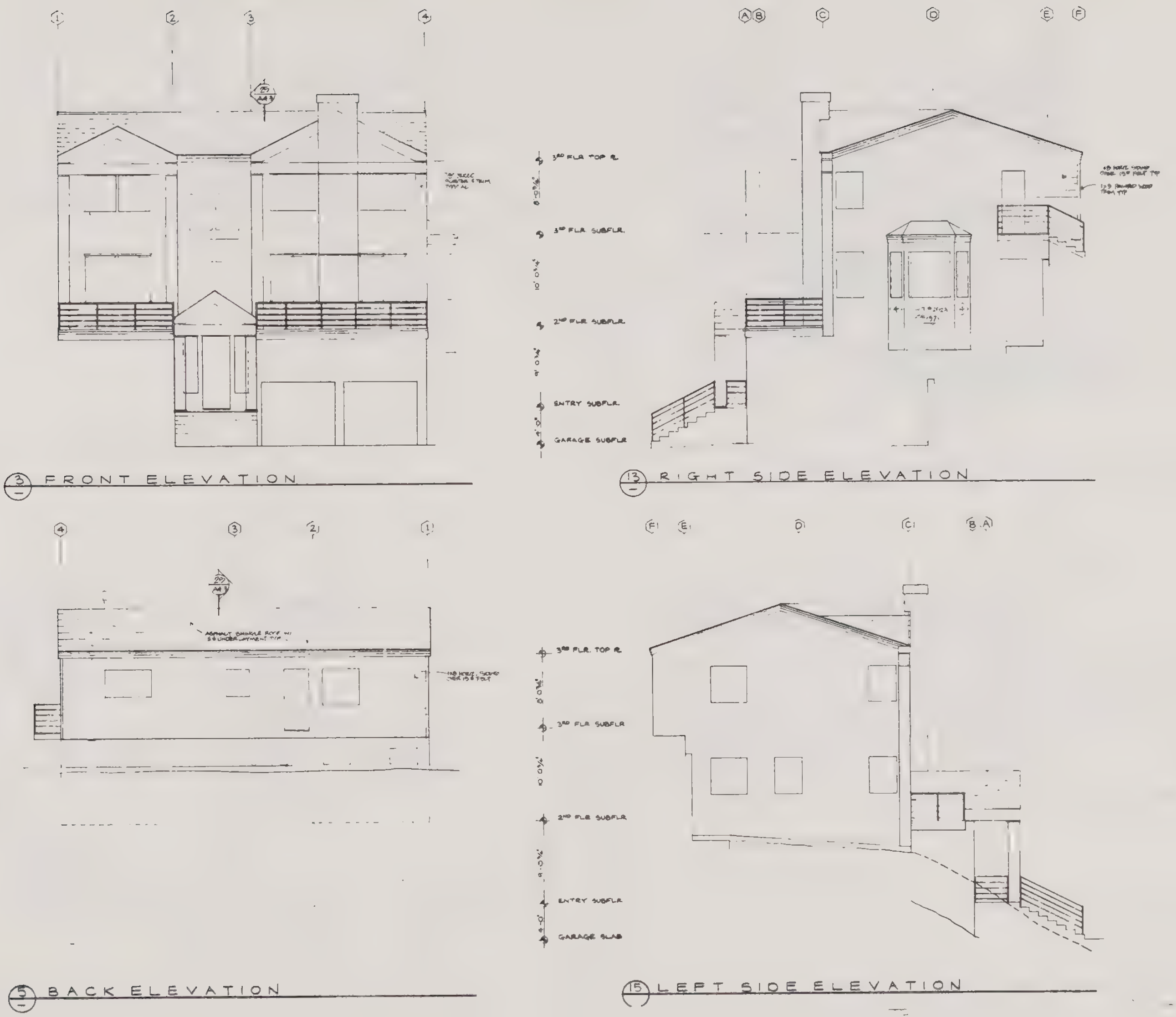


Figure 12.

UNIT ELEVATIONS - WILLOW GLEN (FARMINGTON) DESIGN

Approx. reduced scale: 1" = 20'

For site locations, see Figures 5, 6, & 9.

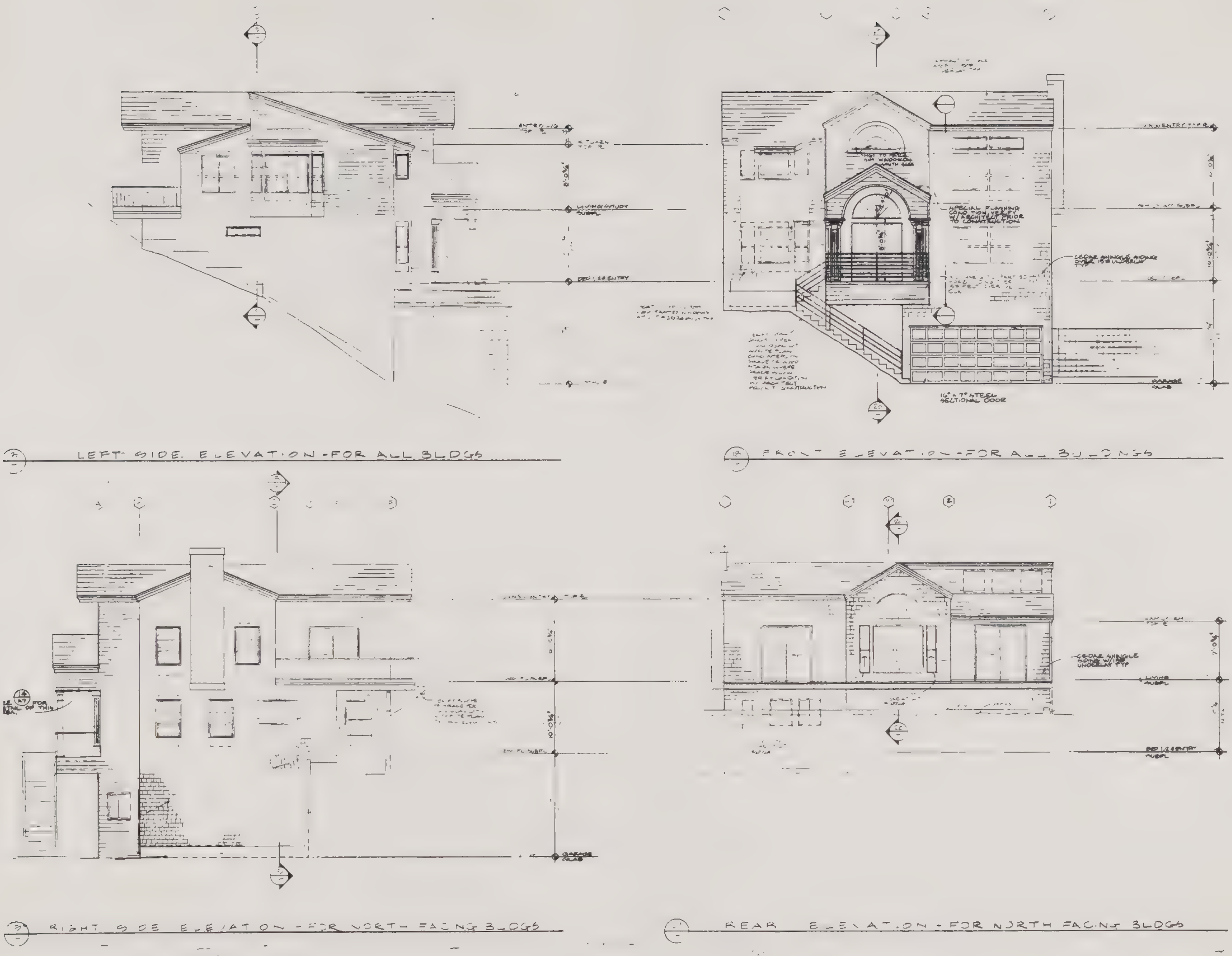


Figure 13.

UNIT ELEVATIONS - MONTCLAIR DESIGN

Approx. reduced scale: 1" = 20'

For site locations, see Figures 5, 6, & 9.

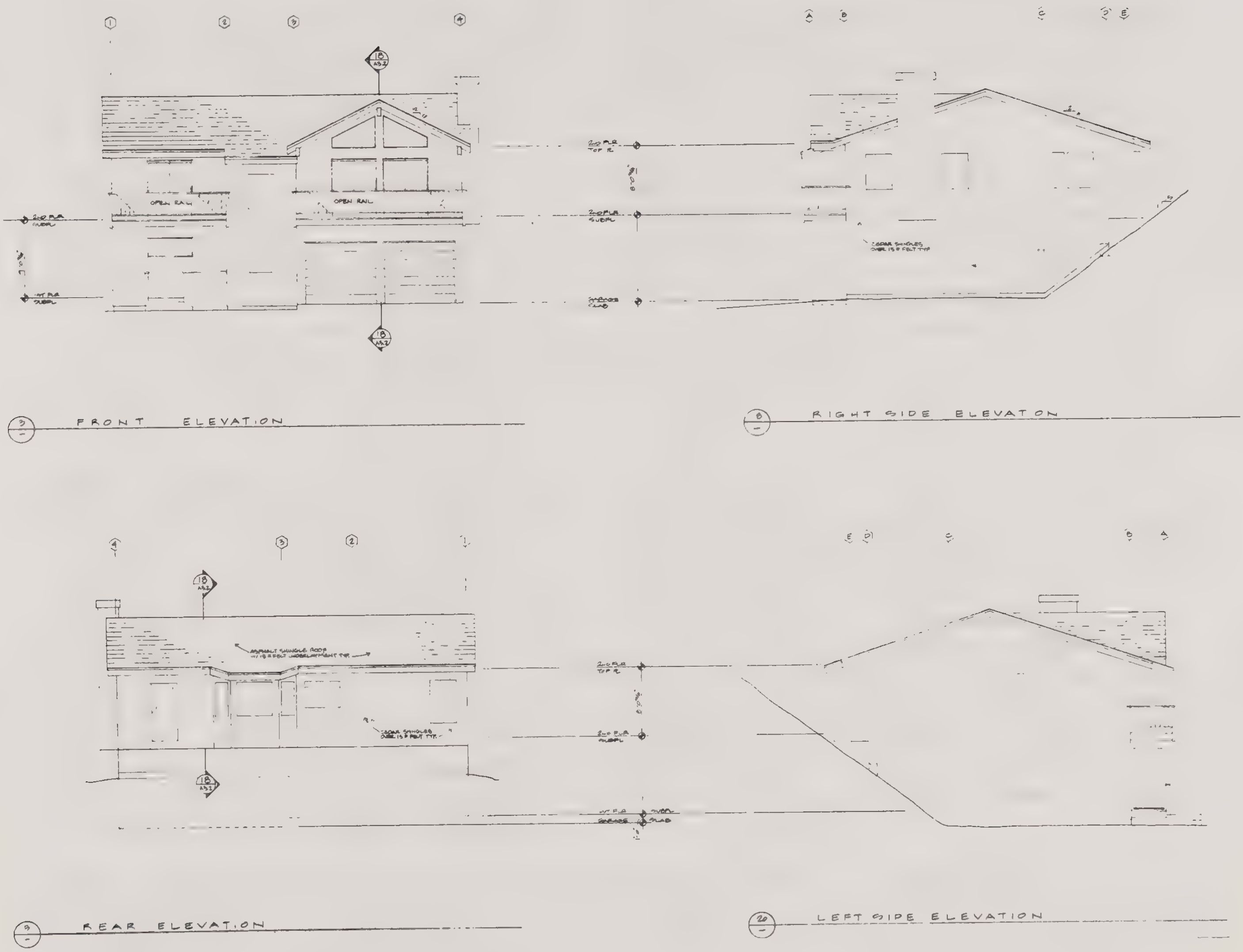


Figure 14.

UNIT ELEVATIONS - BROADVIEW DESIGN

Approx. reduced scale: 1" = 20'

For site locations, see Figures 5, 6, & 9.

III.
ENVIRONMENTAL INVENTORY

A. SERVICES AND UTILITIES

Gas, Electricity, and Telephone. These utility services are currently available to the project site. Although the project would contribute to long-term cumulative demand, no significant impacts on these services would result from project development. (For scenic quality, the project's wire services, including cable TV, should be installed underground.)

Police. Police service for the project area is provide by the Oakland Police Department. Although the project would contribute to long-term cumulative demand, no significant impacts on the project-area's police service would result from development as proposed. (Oakland Police Dept., Planning Div., July 20, 1988) Although the project would not have significant police-services impact, the Police Department has recommended a number of development features which would enhance dwelling-unit security and thereby reduce cumulative demand for police services. These are listed in the Police Department memorandum contained in Appendix B.

Sewage Disposal. The sewer system at the project site is shown on Figures 5, 8, and 17 A-B. The existing system consists of two lines which drain the area above and east of the site, and converge at a manhole in the easterly terminus of the Beaconsfield Place right-of-way, from which an eight-inch line drains westward along the approximate centerline of the right-of-way. Although the project would contribute to long-term cumulative demand, with the existing system, required project modifications to the system, and current treatment-plant capacity, no significant sewer-service impacts would result from development as proposed. (Oakland Office of Public Works, Engineering Services, July 19, 1988) The City's Office of Public Works has indicated that the Beaconsfield Place sewer line should be reconstructed at a maximum depth of six feet in order to limit the amount of excavation that might be required for future repairs (see item #1 of OPW memorandum dated Nov. 2, 1988, in Appendix B).

Water. The East Bay Municipal Utility District (EBMUD) storage facility for the site and adjacent areas is the three-million-gallon Carisbrook Reservoir, at the intersection of Carisbrook Drive and Darnby Drive. Water service is currently available to the project site from a four-inch line in the Beaconsfield Place right-of-way, at the site's west boundary. Development as proposed will require the extension of a water line onto the site, along Beaconsfield Place, to serve individual units and a new fire hydrant. Although the project would contribute to long-term cumulative demand, with the available capacity of the Carisbrook Reservoir, no significant domestic-water-service impacts are anticipated with ultimate development of 20 project-site units. (EBMUD, Water Service Planning, July 19, 1988)

Although EBMUD does not anticipate significant water-use impacts which can be attributed solely to the proposed project, recurring drought conditions require consideration of general measures which can reduce traditional levels of water use for new development, including both domestic consumption and water use during construction. Methods for limiting long-term domestic consumption include

landscaping with drought-tolerant species and installation of water-efficient irrigation systems, and the installation of water-conserving residential plumbing facilities. For construction procedures such as dust control and flushing of new sewer lines, recycled water should be used. (EBMUD provides regular advisory service regarding water-conserving facilities and construction practices.)

Fire Protection. Firefighting service is provided by the Oakland Fire Department. A first response to a fire at the project site, estimated at 3-3½ minutes (assuming firefighters and vehicles at the station), would be by Engine 25, located at Joaquin Miller Road and Butters Drive. A second, first-alarm response, estimated at slightly more than 3½ minutes, would be by Engine 24, located at 6225 Moraga Avenue, near the downtown Montclair area. (Oakland Fire Dept., Engines 24 and 25, July 20, 1988)

Due to heavy vegetative fuel-loading and steep slopes, the area of the project site is classified by the Oakland Fire Department as a critical-fire-hazard area, for which the Department has great concern regarding vegetative clearance, roofing materials, building access, and firefighting water supply associated with new development. Project development would be required to conform to a number of fire-prevention standards, including fire-retardent roofs, vegetation clearance during construction, installation of "hard wired" smoke detectors, and availability of adequate firefighting water supply and water pressure. Because the Fire Department's minimum standard for hydrant availability is a hydrant within 500 feet of any dwelling unit, at least one hydrant will be required along the new project street. The existing fire hydrant nearest the project site is approximately 490 feet from the west site boundary, on the south side of Chelton Drive, east of the Beaconsfield intersection. (Oakland Fire Dept., Fire Protection Bureau, July 19, 1988)

Schools. Public schools serving the area of the project site are the following:

Grades K-6:	Joaquin Miller Elementary School 5525 Ascot Drive
Grades 7-9:	Montera Junior High School 5555 Ascot Drive
Grades 10-12:	Skyline High School 12250 Skyline Boulevard

These schools have adequate enrollment capacity to accommodate the anticipated student population of 20 project-site units. Therefore, no significant public-school impacts are anticipated, although project development would contribute to long-term cumulative demand for public school services and facilities. Although a service is available for handicapped students, regular school-bus service is not provided by the Oakland Public Schools. (Oakland Public Schools, Administrative Office, July 28, 1988)

Trash Collection. Waste Management-Oakland Scavenger Company provides trash collection service in the area of the project site. Twenty additional units in the project area would have no siignificant impact on trash-collection or disposal services or facilities, although they would cumulatively contribute to the long-term need for land-fill area. (Oakland Scavenger Co., Apr. 26, 1989)

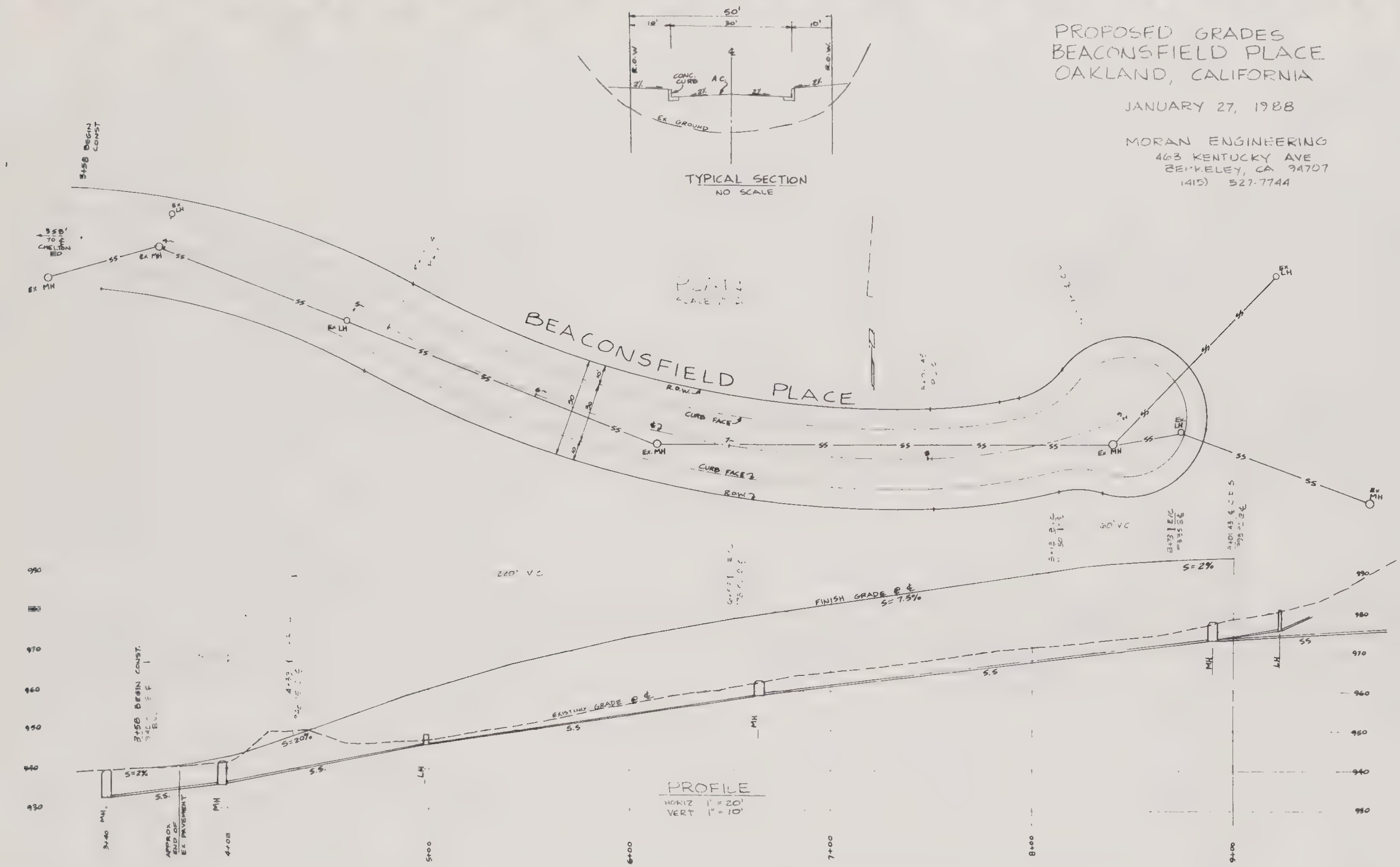


Figure 17-A. PROJECT-ROADWAY PLAN/PROFILE
Showing existing 50-foot right-of-way, proposed 30-foot street, existing and proposed roadway grades, and existing sewer system.
(Note: This is an engineering plan with profile vertical scale twice as large as horizontal scale. Therefore, roadway fill appears twice as great as actually proposed. Figure 7 street profile shows uniform horizontal and vertical scale.)

For cross-sections matched to this plan, see Figure 17-B.

SS = Sanitary sewer

MH = Manhole

LH = Lamphole (clean-out)

Reduced Scale:

Horizontal: 1" = 80'
Vertical: 1" = 40'

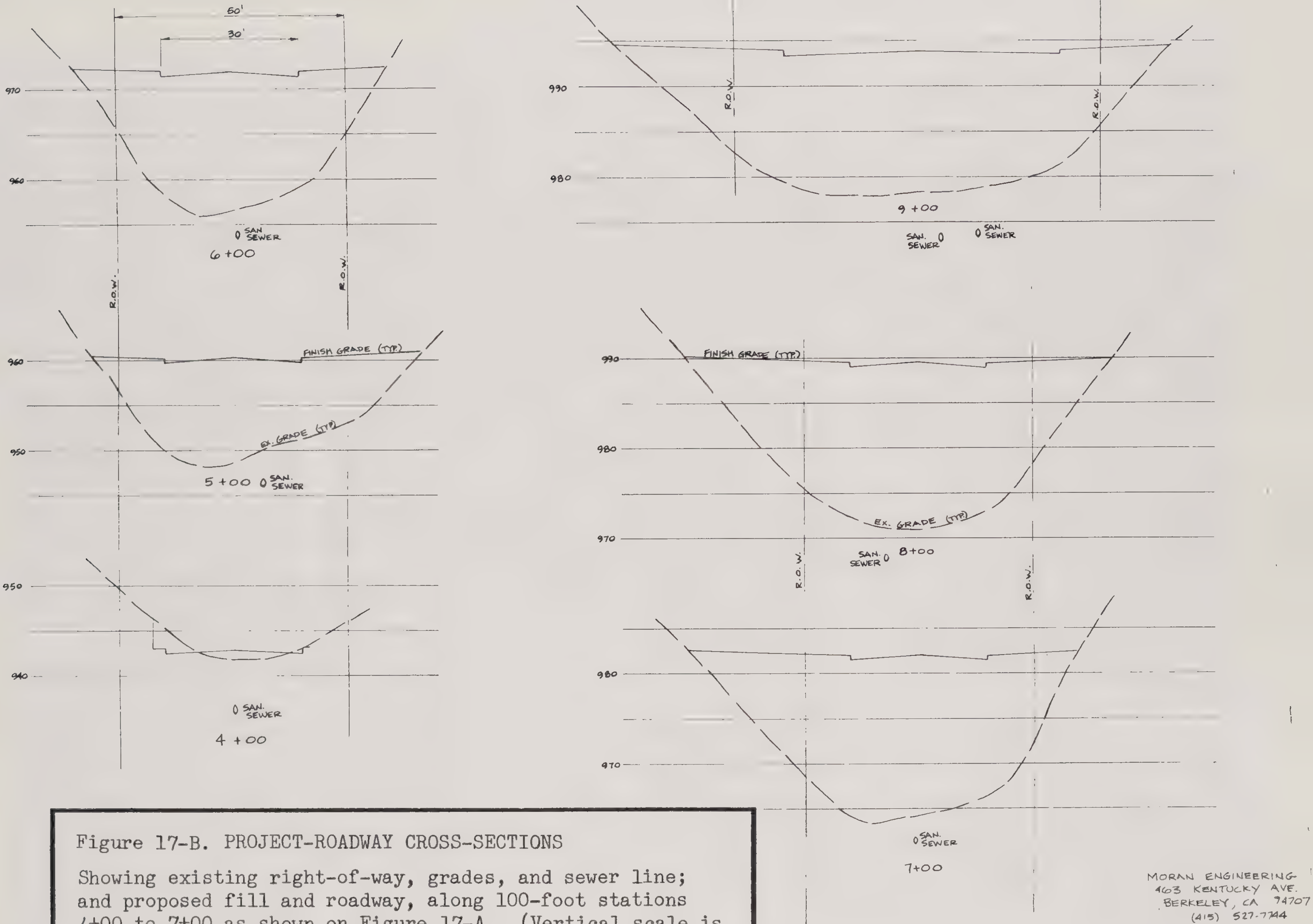


Figure 17-B. PROJECT-ROADWAY CROSS-SECTIONS

Showing existing right-of-way, grades, and sewer line; and proposed fill and roadway, along 100-foot stations 4+00 to 7+00 as shown on Figure 17-A. (Vertical scale is twice horizontal scale; see Figure 7 sections for uniform horizontal/vertical scale.)

Reduced Scale: Horizontal: 1" = 30' Vertical: 1" = 15'

Parks and Recreation. The project site is well located with regard to access to local and regional park and recreation facilities. Nearby local facilities include Sulphur Springs and Shepherd Canyon Parks, the Montclair Recreation Center and Park, in the downtown Montclair area, and Dimond Center and Park, on the west side of Highway 13. Regional facilities within easy driving distance include Redwood, Anthony Chabot, Robert Sibley, and Charles Lee Tilden Regional Parks, the City of Oakland's Joaquin Miller Park, and Lake Temescal Park, adjacent to the Highway 24/Highway 13 interchange. Considering the relatively modest additional population which would result from project development, and the availability of a broad range of park and recreation facilities, it is not anticipated that the project would result in significant park-and-recreation impacts, although it would make a minor long-term contribution to the cumulative demand for such facilities.

B. TRAFFIC, CIRCULATION, AND PARKING

Access (Figs. 1, 2, and 18)

The primary access route to the project site is from the area of the Park Boulevard/Warren Freeway interchange, south on Mountain Boulevard, to Ascot Drive, Chelton Drive, and Beaconsfield Place. (The distance from Park Boulevard to the site is approximately one roadway mile.) The site is also accessible along several other routes: 1) from Joaquin Miller Road, north on Mountain Boulevard to Ascot Drive; 2) from Mountain Boulevard, southeast on Scout Drive to Ascot Drive; 3) from the Skyline Boulevard/Ascot Drive intersection, located southeast of the site; and 4) from upper Shepherd Canyon Road northeast of the site, southwestward along residential streets to Chelton Drive.

In the immediate project area, secondary access is available from Chelton Drive west of the site, along Keswick (driveway) to the west end of Keswick Court, then to Beaconsfield Place at the west site boundary.

Circulation Characteristics (Figs. 4 and 18)

The circulation system in the area of the project site is fairly characteristic of Oakland Hills residential areas. The streets have two travel lanes, with narrow-to-moderate pavement width; limited shoulder areas for on-street parking; occassional sharp, steep curves; and a number of locations with limited sight distance which is due to combinations of sharp curves, changes in roadway gradient, vertical curves (roadway humps), and roadside embankments and vegetation.

Ascot Drive. Ascot Drive is a residential collector with 20 to 40 feet of pavement width in 50 to 60 feet of right-of-way width, with limited stretches of roadway shoulder. The narrowest stretch of lower Ascot Drive, just above Larry Lane, has 20 feet of pavement width with a steep, cut-slope embankment on one side and a narrow walkway and steep creek-embankment on the other side. From Mountain Boulevard to Chelton Drive, Ascot Drive rises about 200 feet in elevation in about 2,000 feet of roadway length. The roadway gradients are variable along this stretch, but overall gradient is about 10% (10 ft. vertical/100 ft. horizontal). Ascot Drive at Chelton Drive is a "T" intersection with a sharp curve on the Chelton leg and a sharp curve and steep grade on the upper Ascot leg. At this intersection, control is limited to a "Yield" sign at the downhill, Ascot Drive approach. Although maneuvering through this intersection requires care, sight distances and roadway configuration and dimensions allow the intersection to function adequately during peak traffic periods.

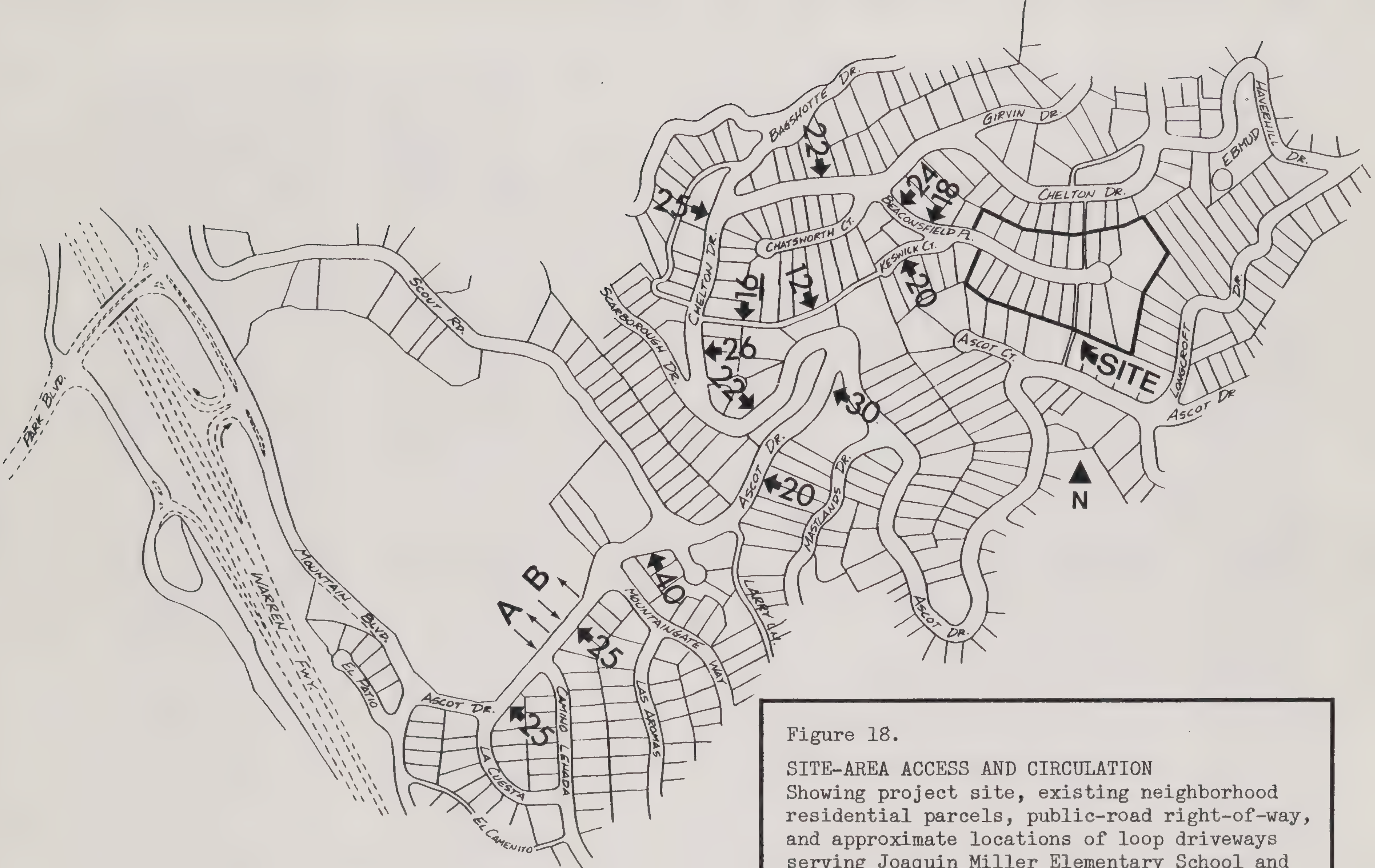


Figure 18.

SITE-AREA ACCESS AND CIRCULATION
Showing project site, existing neighborhood residential parcels, public-road right-of-way, and approximate locations of loop driveways serving Joaquin Miller Elementary School and Montair Junior High School.

00➔ = Roadway pavement width (feet)

A = Joaquin Miller School

B = Montera Junior High School

Scale: 1 " = 500'

On lower Ascot Drive, access to Joaquin Miller Elementary School and Montera Junior High School is provided by two one-way loop-driveways on the northwest side of the street, between Camino Lenada and Mountaingate Way. A combination of Ascot Drive roadway curves, roadside terrain, and a hump in the road near Mountaingate Way results in poor sight distance along Ascot Drive in this area, and at the Mountaingate approach to Ascot.

Chelton Drive. Chelton Drive is a residential collector with 22 to 25 feet of pavement width in a 60-foot right-of-way, with limited stretches of roadway shoulder. Between Ascot Drive and Beaconsfield Place, the Chelton Drive grade appears to be on the order of 10%, with a somewhat steeper, short stretch along the curve between Ascot Drive and Scarborough. At Beaconsfield Place/Chatsworth Court, the Chelton Drive slope is moderate and the pavement width is about 70 feet, which allows adequate area for a bus stop on the south side of the street. From Beaconsfield Place and Chatsworth Court, the sight distance along Chelton Drive is about 300 feet looking uphill and about 200 feet looking downhill (with vehicles pulled forward to the edge of the Chelton travelway). This is adequate sight distance, with existing Chelton Drive traffic volume, to accommodate both the modest level of existing turning movements and anticipated project traffic.

Beaconsfield Place. Beaconsfield Place is a local residential street with a 50-foot right-of-way, with pavement width of about 24 feet near Chelton Drive and about 18 feet approaching the project site. The roadway pavement terminates at the west boundary of the project site, about 300 feet from Chelton Drive. The steepest stretch of the roadway slope appears to be about 12-13%. Three developed residential lots have access from Beaconsfield Place, two on the southwest side of the street, below Chelton Drive, and one on the south side of the street, abutting the west project-site boundary.

Within the project boundaries, Beaconsfield Place is an unimproved, 50-foot-wide public right-of-way cul-de-sac, with a roughly-graded dirt road following the approximate alignment of the right-of-way.

Keswick Court and Driveway. Keswick Court is a 200-foot-long residential street with a 50-foot right-of-way and about 20 feet of pavement width, with paved shoulder along the north side. The east end of Keswick Court intersects Beaconsfield Place near the west boundary of the project site. Because of the sharp angle of this intersection, and the elevation of Beaconsfield above Keswick, sight distance is poor from the Keswick approach. This street has two developed residential lots on the north side and one house and three vacant lots on the south side.

The Keswick "driveway" is a 20-foot-wide public right-of-way, about 700 feet long, which connects the west end of Keswick Court with Chelton Drive, near Scarborough Drive. Pavement width along this route is generally about 12 feet (about 10 feet in one spot), but is about 16 feet near Chelton Drive. Along most of its length, the possibility of improving this roadway is limited by a steep, upslope embankment on the north side and a steep, downslope embankment on the south side. There are three existing houses with access from the west end of this roadway, just east of Chelton Drive. At the west end of Keswick driveway, sight distance for outbound turning movements is often restricted by parked vehicles on the east side of the street just south of the intersection.

Condition of Roadway Improvements. Based on field observations, the streets providing access to the project site generally have fair-to-good pavement condition. Beaconsfield Place, however, may have some problems. This street appears to have been built on fill, resulting in a steep, cut-slope embankment above the northerly side of the street, west of the project site, and a steep fill embankment below the southerly side of the street, approaching Keswick Court. The roadway pavement along the downhill lane has a long network of longitudinal cracking, which may indicate that the fill along the outer edge of the roadway has been sinking. (These cracks are separate from what is apparently a repaved utility trench which also extends along the outside of the roadway.) Also, on lower Beaconsfield Place, at the approach to the project site, the roadway pavement is in very poor condition.

Public Transportation. Public transportation in the project-site area is provided by the AC Transit District, along the #18 Park Boulevard bus route. This route includes a clockwise loop around the project area: up lower Ascot Drive, up Chelton Drive, along Carisbrook Drive and Skyline Boulevard, and along upper Ascot Drive and back down lower Ascot Drive. Along this route, observed weekday headway times have ranged from one-half hour to one hour. The bus stop nearest the project site is located on the south side of Chelton Drive, between Chatsworth Court and Beaconsfield Place.

Proposed Circulation and Parking Improvements (Figs. 5-7, 9, and 17-A)

Proposed roadway improvement is construction of a 30-foot-wide street, with cement-concrete curbs and gutters and a 30-foot-radius cul-de-sac turnaround area, along the on-site Beaconsfield Place right-of-way. The new street would be built on fill excavated from the lower slopes of the site and placed on the canyon floor. Maximum roadway grade would be about 17-20% for a stretch of about 150-170 feet at the west end of the site. The easterly half of the street would have about 7.5% grade, except for the turnaround area, which would be nearly level.

Proposed on-site circulation improvements do not include sidewalks. However, the City's Office of Public Works has indicated that a sidewalk will be required along the new private street (see item #2, OPW memorandum of Nov. 2, 1988, in Appendix B). If a sidewalk is required, it is recommended that the width be no more than three feet, which would be sufficient to accommodate the minor pedestrian traffic which the project would generate, without substantially reducing front-yard landscaping areas.

Proposed parking includes two garage spaces for each unit. Based on the submitted plans, nine of the proposed units would have 20-foot-long, two-car driveways (or alternative driveway arrangements) which could theoretically bring their off-street parking capacity up to four spaces. However, eight of the units would have driveway lengths as short as 15 feet. These shorter driveways might be able to accommodate small vehicles, but, depending on precise driveway lengths and parking habits, some of them would not accommodate the largest vehicles without overhang into the street. Because single-family garages are often used for storage, leaving only driveway areas for off-street parking, it is probably not realistic to believe that each of the proposed units (and future units built on the three project-site vacant lots) would normally have two garage spaces available. Also, it can be expected that some of the property owners with shorter driveways would choose to park in the

street if they were not able to park in their garages. Thus, it can be anticipated that residents' vehicles will regularly be parked on the street, as is often the case throughout the project-area neighborhood. With vehicles parked on both sides of the 30-foot street, travelway width could be reduced to 16 or 18 feet, which in turn could lead to traffic congestion and disruption of firefighting-vehicle access.

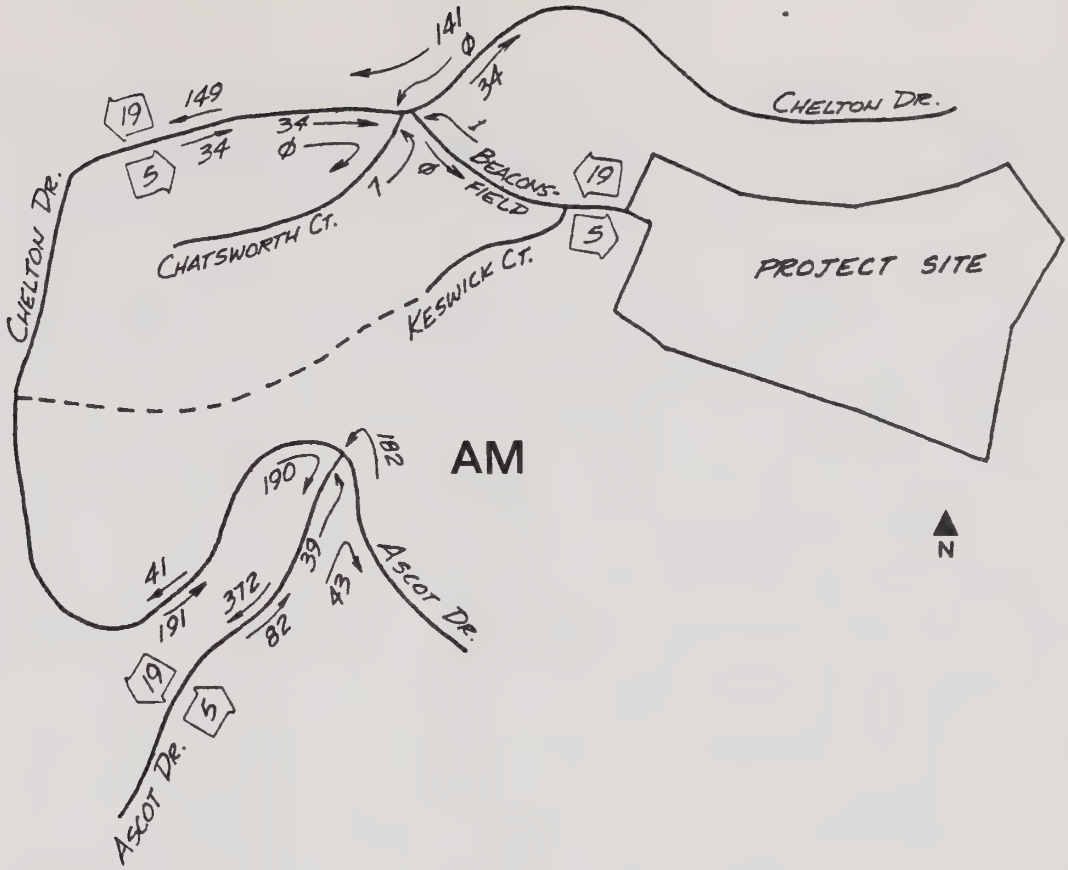
(As noted in item #1 of the memorandum of March 9, 1988, contained in Appendix C, the Fire Department has recommended that the project street have 30 feet of <u>unobstructed</u> width. Although it is important to provide adequate emergency-vehicle access, this recommendation seems excessive because it would require 46 feet of street width to accommodate 30 feet of unobstructed travelway, plus eight-foot-wide paking areas along both curbs. Such street width would be inconsistent with the developed character of the project-site neighborhood and would substantially increase the visual impact of the project by reducing front-yard landscaping area in favor of asphalt paving. The issue of adequacy of street-travelway width relative to the need for on-street parking is discussed further in the impact/mitigation section of the EIR. That section includes a recommended street-plan alternative which would provide for both on-street parking and adequate travelway width. It should be noted that the proposed 60-foot-diameter cul-de-sac turnaround area, even with on-street parking, would be adequate to provide the 50-foot-diameter, unobstructed turnaround area recommended by the Fire Department.)

<u>Existing Traffic</u> (Fig. 19)

Morning and afternoon peak-period traffic counts were made during July, 1988, at the Ascot Drive/Chelton Drive intersection and at the Chelton Drive/Chatsworth Court/Beaconsfield Place intersection (see count sheets in Appendix D). These counts indicate that peak-hour traffic at Chelton/Chatsworth/Beaconsfield (7:15-8:15 a.m.; 5:15-6:15 p.m.) is on the order of 200 vehicles, mostly through-traffic on Chelton, with minor volumes on Chatsworth and very little traffic on Beaconsfield. At Ascot/Chelton, peak-hour traffic (7:30-8:30 a.m.; 5:30-6:30 p.m.) is on the order of 460 vehicles, with one-half of the a.m. vehicles to-from Chelton and one-half to-from upper Ascot Drive; and with about 60% of p.m. vehicles to-from Chelton and 40% to-from upper Ascot. These traffic volumes are moderate for a roadway system serving an extensive residential area. (It is recognized that summertime traffic counts are often lower than wintertime counts. However, adding an estimated 10-15% to the observed volumes, to account for additional wintertime school-related traffic, would not substantially change the figures.)

<u>Vehicle Speed</u>. Concerns which some project-area residents have expressed regarding traffic seem to relate primarily to vehicle speed. Based on observations made during EIR traffic counts, it is apparent that many of the motorists who use the project-area roadways have unsafe driving habits. They drive too fast, often drifting across roadway center lines at curves; they ignore stop signs; they tailgate; and they often busy themselves with grooming and other activities which can distract their attention from driving. This behavior, however, is endimic, and is likely to continue with or without development of the proposed project.

<u>School Traffic</u>. Because this EIR was prepared during the summer of 1988, it was not possible to observe school-related traffic along Ascot Drive at the entrances to Joaquin Miller and Montera Schools. However, as discussed above, the circulation system at the school sites has been observed, and staff members of Joaquin Miller School and the Oakland Public Schools have provided insights regarding school-year



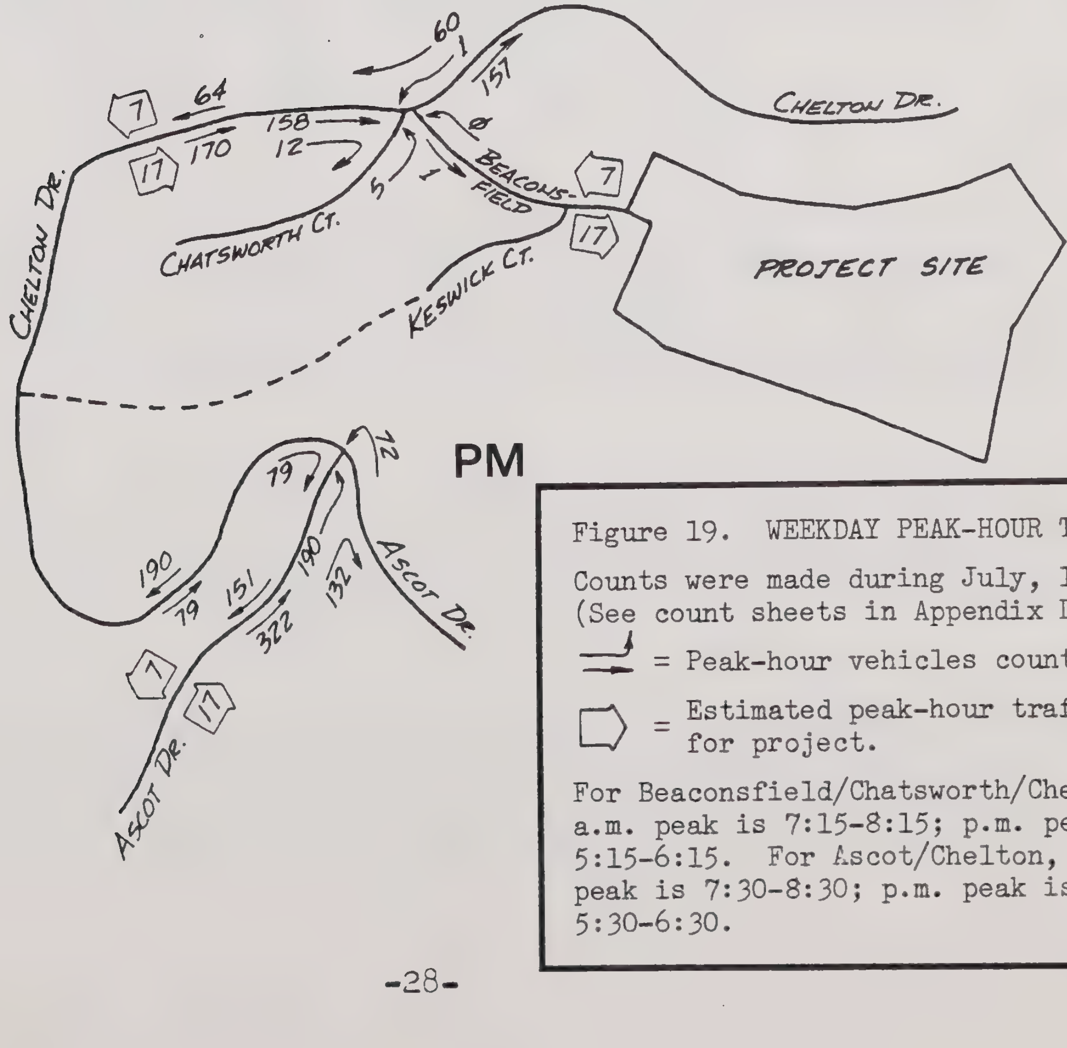


Figure 19. WEEKDAY PEAK-HOUR TRAFFIC

Counts were made during July, 1988. (See count sheets in Appendix D.)

= Peak-hour vehicles counted.

= Estimated peak-hour traffic for project.

For Beaconsfield/Chatsworth/Chelton, a.m. peak is 7:15-8:15; p.m. peak is 5:15-6:15. For Ascot/Chelton, a.m. peak is 7:30-8:30; p.m. peak is 5:30-6:30.

traffic problems. Based on this information, it is evident that, during the school term, when parents are picking-up and dropping-off their children, there is often heavy congestion, and potential traffic and pedestrian hazards, in the area of the schools, especially during the morning peak-period, when commuter traffic and school traffic coincide.

The Oakland Public Schools do not provide regular bussing service. It is assumed that some students ride the AC bus, but the extent of such ridership is not known. Although the Oakland Public Schools administration does not have traffic counts, the staff has indicated the belief that the two Ascot Drive schools have higher-than-average traffic because many parents are reluctant to allow their children to walk to school along roadways without walkways or shoulders. (The school term begins after Labor Day and runs to the middle of the following June; Sept. 6 to June 16 for 1988-89. Joaquin Miller hours are 8:35 a.m. to 3:18 p.m.; Montera hours are 8:30 a.m. to 3:10 p.m. Joaquin Miller enrollment for 1988-89 is about 830 students and Montera enrollment is about 450, for a total of about 1,280 students. Although this level of enrollment cannot be translated directly into school-related traffic, it indicates a potentially-high level of periodic congestion.)

Project Traffic (Fig. 19. Projections based on ultimate 20-unit development.)

Based on a factor of 12 trips/day/unit, the developed project site would generate 240 trips/day (120 round trips). Assuming a peak-hour generation of 10% of daily trips (1.2 trips/unit/peak hour), project-site peak-hour volume would be 24 trips (12 round trips). (The EIR p.m. count at Chelton/Chatsworth/Beaconsfield showed 18 trips for Chatsworth Court, 13 inbound and 5 outbound, which, with a total of 15 houses on Chatsworth, equals 1.2 trips/unit.) Assuming that a.m. trips are 80% outbound and 20% inbound, and p.m. trips are 30% outbound and 70% inbound, estimated project peak-hour trips are as follows:

Peak Hour	Outbound	Inbound	Total
AM	19	5	24
PM	7	17	24

It is assumed that average daily trip-distribution would be primarily outbound to Chelton Drive-westbound and inbound on Chelton Drive-eastbound. Thus, the estimated worst-peak-hour situation would be 19 a.m. outbound left-turns onto Chelton. This would be an average of about one outbound vehicle each three minutes. This volume of traffic would have no significant congestion or traffic-hazard impacts, although it would contribute to long-term, cumulative traffic volume in the project area.

With 240 trips/day and 48 peak-hour trips/day, the project site would generate 192 off-peak daily trips (96 round trips). Thus, assuming that 96 outbound left-turns onto Chelton Drive all occur during the eight-hour period between morning and afternoon peak hours, the average for such turns would be one each five minutes. This volume of off-peak traffic would have no significant congestion or traffic-hazard impacts.

Inbound project-site trips would generally be right-hand turns, which could not be expected to have adverse impacts at the Chelton/Beaconsfield intersection because of the available deceleration area provided by the wide Chelton Drive pavement. At the Ascot/Chelton intersection, project-site peak-hour vehicles, moving with the general flow of commuter traffic, would result in a cumulative increase in traffic volume, but would have no significant traffic impacts.

Construction Traffic.

It is proposed that project development occur in three discreet phases. The first phase would include overall site improvements--major earthwork, street construction, installation of utility and drainage facilities, etc., and construction of four to six houses. The second and third phases, possibly covering a period of four to five years, would each involve the construction of four to six houses. First-phase construction would involve periodic use of Ascot Drive, Chelton Drive, and Beaconsfield Place for the transportation of materials and equipment, including large trucks for hauling grading and paving equipment, asphalt, lumber, ready-mix, aggregate, pipe, etc. At the project site, sufficient area will be required to accommodate construction-vehicle access, maneuvering (turning around), queueing (ready-mix, asphalt, and aggregate deliveries), stockpiling of materials, and parking (overnight parking for equipment; truck parking, for offloading materials; and daytime parking for idle equipment, construction workers, surveyors-engineers, etc.). Although construction traffic would not be continuous during any phase of project development, it is expected that the heaviest concentrations would occur during the estimated four months which would be required to construct overall site improvements. Thereafter, first-phase house construction and two later phases of house construction, each of which is estimated at up to eight months, would involve less intensive--but occassionally substantial--construction traffic. (See Appendix E for projections of construction timing, procedures, and equipment.)

Because of the character of the roadway system serving the project site, existing traffic problems at the Montera School and Joaquin Miller School entrances, and limited access and maneuvering area at the project site, construction traffic will have to be carefully planned and supervised to minimize traffic congestion and safety hazards. At the entrance to the project site, maneuvering space is limited to an area of about 35 by 60 feet, which comprises the lower, paved area of Beaconsfield Place at Keswick Court. This area is bordered on the north by a steep, cut-slope embankment, and is bordered on the south by the house at 2639 Beaconsfield Place, which immediately abuts the paved roadway area.

C. GEOLOGY, SOILS, SEISMICITY, AND GRADING

Bedrock Geology

The most recent mapping of the site and vicinity is that of the U.S. Geological Survey (Radbruch, 1969). According to this map, the area planned for grading and development is almost entirely within the outcrop belt of the Shepherd Creek Formation (Ks), as shown on Figure 20. A small area in the southwest corner of the site is underlain by the Oakland Conglomerate (Ko). The Shepherd Creek Formation consists chiefly of massive shale with interbedded sandstone. This unit is more erodable than the Oakland Conglomerate, and its depth of weathering ranges up to 20 feet. Weathered shale is described by Radbruch as "soft, crumbly, clayey." Soils and colluvium generally are five feet or more in thickness. Slope stability and foundation conditions are considered to be good for most of this unit. However, Figure 20 shows a small landslide (represented by a small black triangle) approximately 250 feet east of the site. This symbol indicates the presence of an active landslide that was easily observable at the time of the Radbruch investigation (late 1960s). The symbol shows the approximate location of the slide but does not represent its extent.

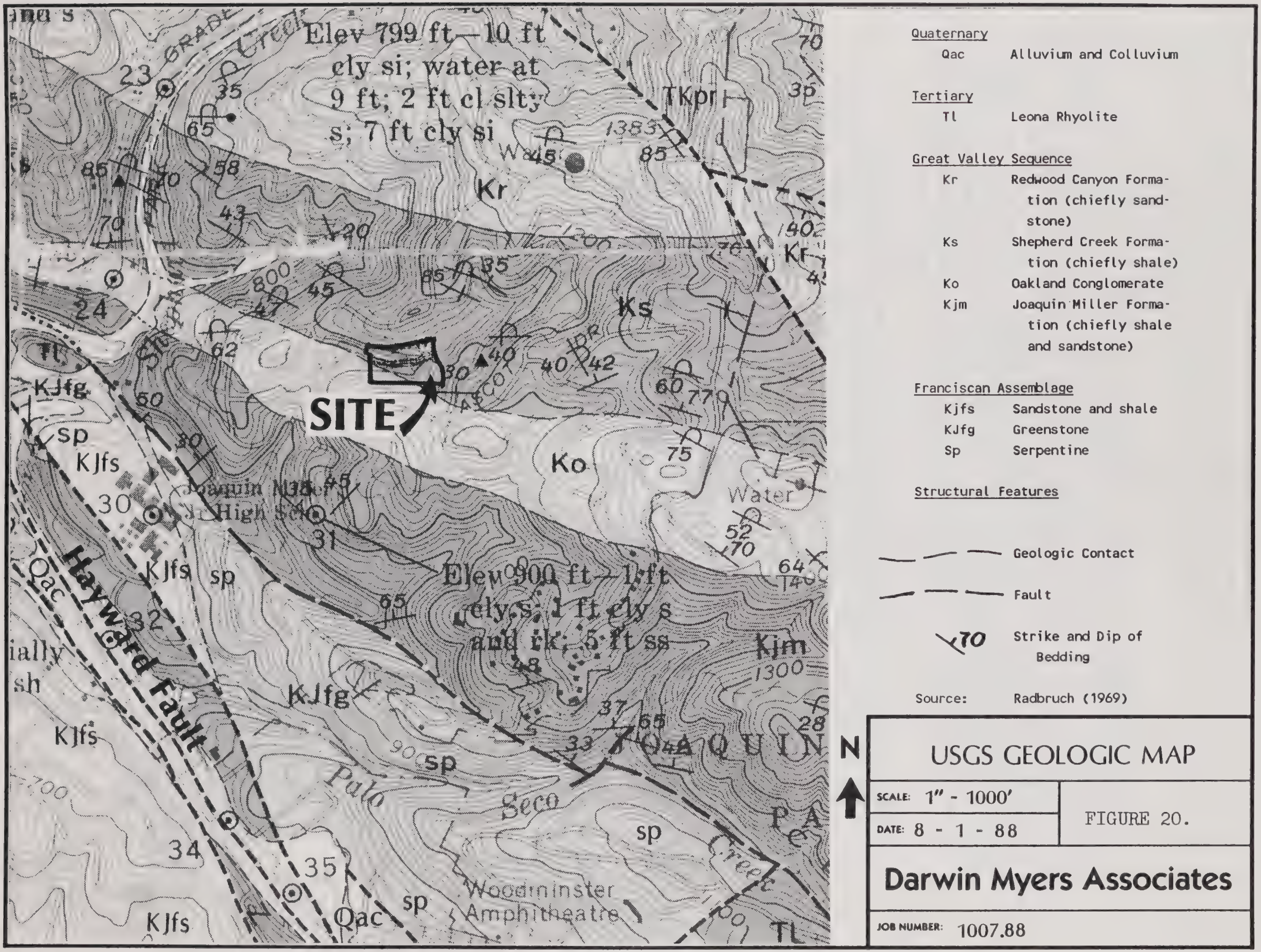

Elev 799 ft—10 ft cly si; water at 9 ft; 2 ft cl slty s; 7 ft cly si
Elev 900 ft—1 ft cly s; 1 ft cly s and rk; 5 ft ss
SITE
Hayward Fault
Kr
Ks
Ko
Kjm
KJfs
KJfg
sp
Tl
Qac
TKpr
Joaquin Miller High Sch
Palo Seco Creek
Woodminster Amphitheatre
JOAQUIN
N
Quaternary
Qac Alluvium and Colluvium
Tertiary
Tl Leona Rhyolite
Great Valley Sequence
Kr Redwood Canyon Formation (chiefly sandstone)
Ks Shepherd Creek Formation (chiefly shale)
Ko Oakland Conglomerate
Kjm Joaquin Miller Formation (chiefly shale and sandstone)
Franciscan Assemblage
Kjfs Sandstone and shale
KJfg Greenstone
Sp Serpentine
Structural Features
Geologic Contact
Fault
70 Strike and Dip of Bedding
Source: Radbruch (1969)
USGS GEOLOGIC MAP
SCALE: 1" - 1000'
DATE: 8 - 1 - 88
Darwin Myers Associates
JOB NUMBER: 1007.88

FIGURE 20.

Bedding in this portion of the Oakland Hills is characterized by strikes of approximately N70°W, and near vertical dip. The bedrock units are cut by northwest-trending faults, including the active Hayward fault, along with Early Tertiary (inactive) thrust faults.

When the geology of the site is examined in detail, it is apparent that the structure is complex. For example, nearby measurements indicate that the dip direction of bedding is highly variable: 30° dip to the north, 40° dip to the south, vertical dip, northeast dip, etc. (Fig. 20). The complex structure in the Shepherd Creek Formation is attributable, at least in part, to the folding and deformation of a massive, 1,200-foot-thick shale unit, that has resulted in internal shearing, minor discordant folding, and squeezing and flow of incompetent units. As a result, the shale is neither isotropic nor homogeneous. There are highly fractured intervals and zones of deeply weathered rock, as well as intervals of dense, competent rock.

No faults are mapped through the site. The active Hayward fault is mapped approximately 3,000 feet southwest of the site, and an unnamed fault that forms the Kjm/sp contact is mapped 1,800 feet southwest of the site (Fig. 20).

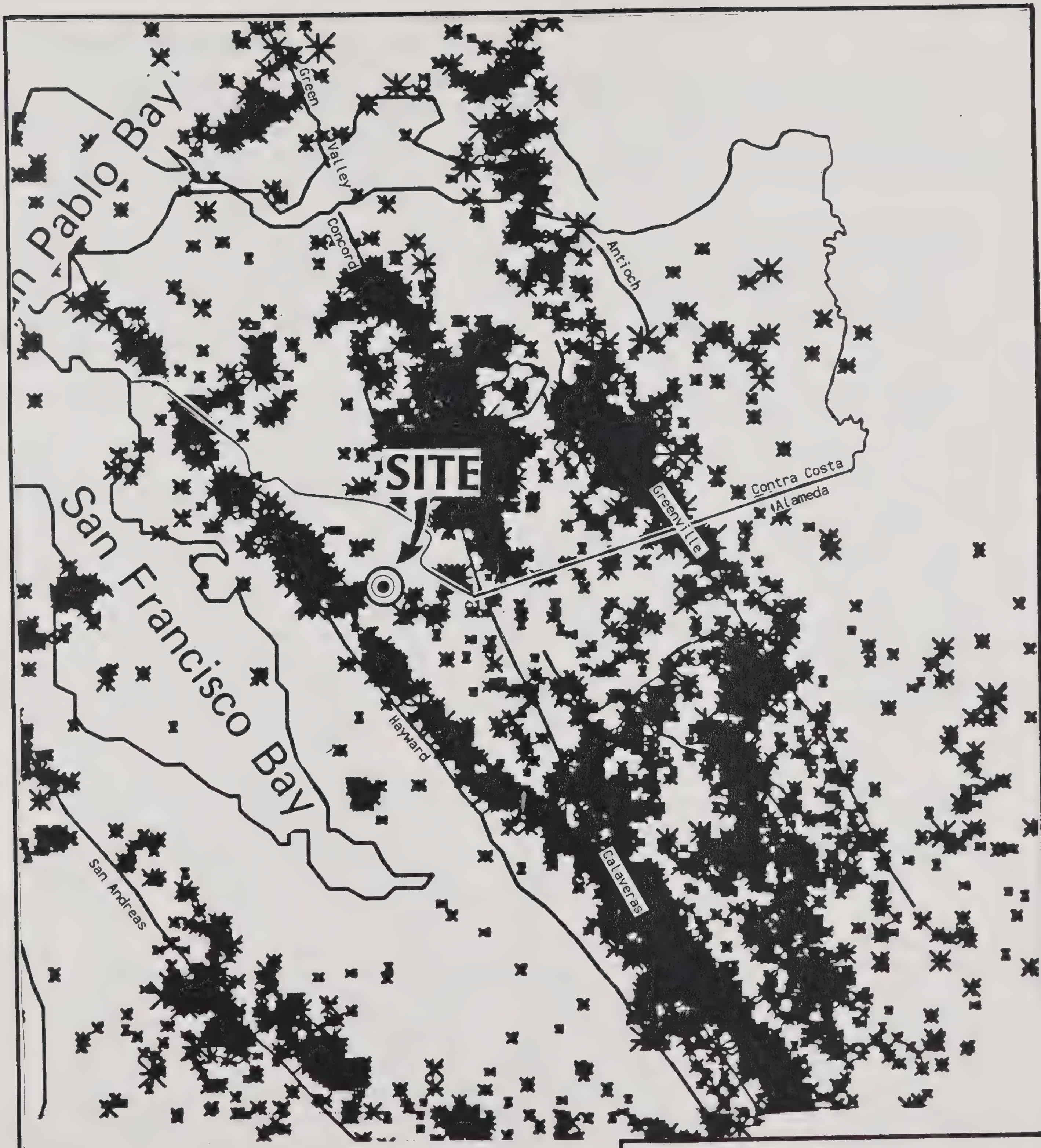
Hayward Fault

The Hayward fault zone comprises a northwest-trending zone of faults along the western front of the hills bordering the east side of San Francisco Bay. The zone can be traced almost continuously northward from the Warm Springs District in southern Alameda County to San Pablo Bay at Point Pinole in Contra Costa County. It can not be traced south of Warm Springs with any degree of certainty. Southeast of the San Francisco Bay area, the Hayward fault is inferred to merge with the Calaveras fault in the vicinity of the Calaveras Reservoir.

Movement along faults within this zone has caused two major, historic earthquakes, one in 1836 and one in 1868. Rupture surfaces were opened between San Pablo and Mission San Jose in 1836; and between Mills College, Oakland, and Warm Springs in 1868. Faulting was reported as far north as the University of California, Berkeley, in the 1868 earthquake.

Tectonic creep was first recognized on the Hayward fault in 1960, and since then, has been observed at various places along its length from San Pablo to Fremont. It has cracked and offset curbs, streets, fences, railroad tracks, pipelines, and buildings. All creep movements appear to be right-lateral. Traces within the zone of faulting are, in some places, clearly delineated by physiographic features such as sag ponds, trenches, scarps, and offsets. In other places, such evidence is very faint, even in areas where we know from historic records that surface faulting took place.

Review of seismic records provides compelling evidence that the Hayward fault is seismically active. For example, the earthquake epicenters recorded by the U.S. Geological Survey (USGS) during the period 1969 through mid-1982 show a good correlation between earthquake epicenters and known active faults, including the Hayward fault (Fig. 21). These epicenters are evidence of adjustments taking place at depth along active Bay Area faults. In a typical year, 20 or more seismic events are recorded by the USGS in the immediate vicinity of the Hayward fault.



EXPLANATION

+ Earthquake epicenter (dark areas are high concentrations of epicenters indicating adjustments taking place at depth along faults)

Calaveras — Active fault zone

Source: USGS CALNET catalog, reproduced from Scheimer & Mills (1984)

EARTHQUAKE EPICENTERS
1969 - MID 1982

SCALE: 1" - 8 mi

DATE: 8 - 1 - 88

FIGURE 21.

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Special Studies Zone

In the aftermath of the 1971 San Fernando earthquake, the California legislature enacted the Alquist-Priolo Special Studies Zone Act. The law directed the California Division of Mines and Geology to prepare special studies zones (SSZ) along active faults in California, and it specifically named the Hayward fault one that was to be included. The official maps of the Hayward fault SSZ were issued in 1974 and were revised in 1982.

The purpose of the SSZ is to ensure that development in proximity to known active faults gives adequate consideration to the hazard of surface fault rupture. The reports must be prepared by geologists registered in California. Also, local jurisdictions are required to provide peer review of such reports, performed by registered geologists.

According to the official studies-zone map, the project site is approximately 0.5 mile northeast of the SSZ. Therefore, evaluation of fault hazards is not required under the provisions of the Alquist-Priolo Act.

Landslides and Slope Stability

The USGS prepared photointerpretive landslide maps of the entire San Farancisco Bay region (Nilsen, 1975). This mapping, for the area of the project site, has been photographically enlarged from the published scale of 1" = 2,000' to a scale of 1" = 600', and is shown, on the project site, on Figure 22. It indicates that the project-site's canyon floor and lower slopes are mantled with colluvium (Qc). Above the site, approximately 200 and 400 feet to the east, two small slides are mapped on the northwest-facing slope of the canyon. The westernmost slide appears to coincide with the slide mapped by Radbruch, discussed above. Each of these slides has an extent of approximately 0.9 acre.

The Nilsen maps are sometimes criticized because they are based solely on interpretation of 1960's aerial photography. Any slides occurring in the 1970's and 1980's are not shown, and the slides that are shown have not been field-checked by the USGS. The slides are not classified by activity status, depth of slide plane, or type of slide deposit. Nevertheless, the maps serve their intended function of "red flagging" areas requiring specific study.

In 1979, the USGS released a relative slope-stability map of the San Francisco Bay region, at a scale of 1:125,000 (approximately 1" = 2 miles). In preparing the map, the USGS used three parameters: slope steepness, bedrock geology, and presence and abundance of landslides. Information on slopes was provided by a USGS slope map; information on project-area bedrock geology and on landslides was based, respectively, on the mapping of Radbruch and Nilsen. Figure 23 shows the USGS Relative Slope-Stability mapping of the site at a scale of 1" = 2,000'. According to this map, the portion of the site that is within the outcrop belt of the Shepherd Creek Formation is in Category 4 (moderately unstable). The remainder of the site is in Category 3 (generally stable to marginally stable). The area east of the site is classified as Category 5 (unstable), due to the existence of landslides mapped by Radbruch and Nilsen in that area. (The area classified as Category 5 includes the slides and their immediately adjacent area.)

Qaf	Artificial fill
Qal	Alluvium
Qc	Colluvium
	Photointerpretive landslide

Source: Nilsen (1975)

N

USGS PHOTOINTERPRETATIVE LANDSLIDE MAP

SCALE: 1" - 600'	FIGURE 22.
DATE: 8 - 1 - 88	

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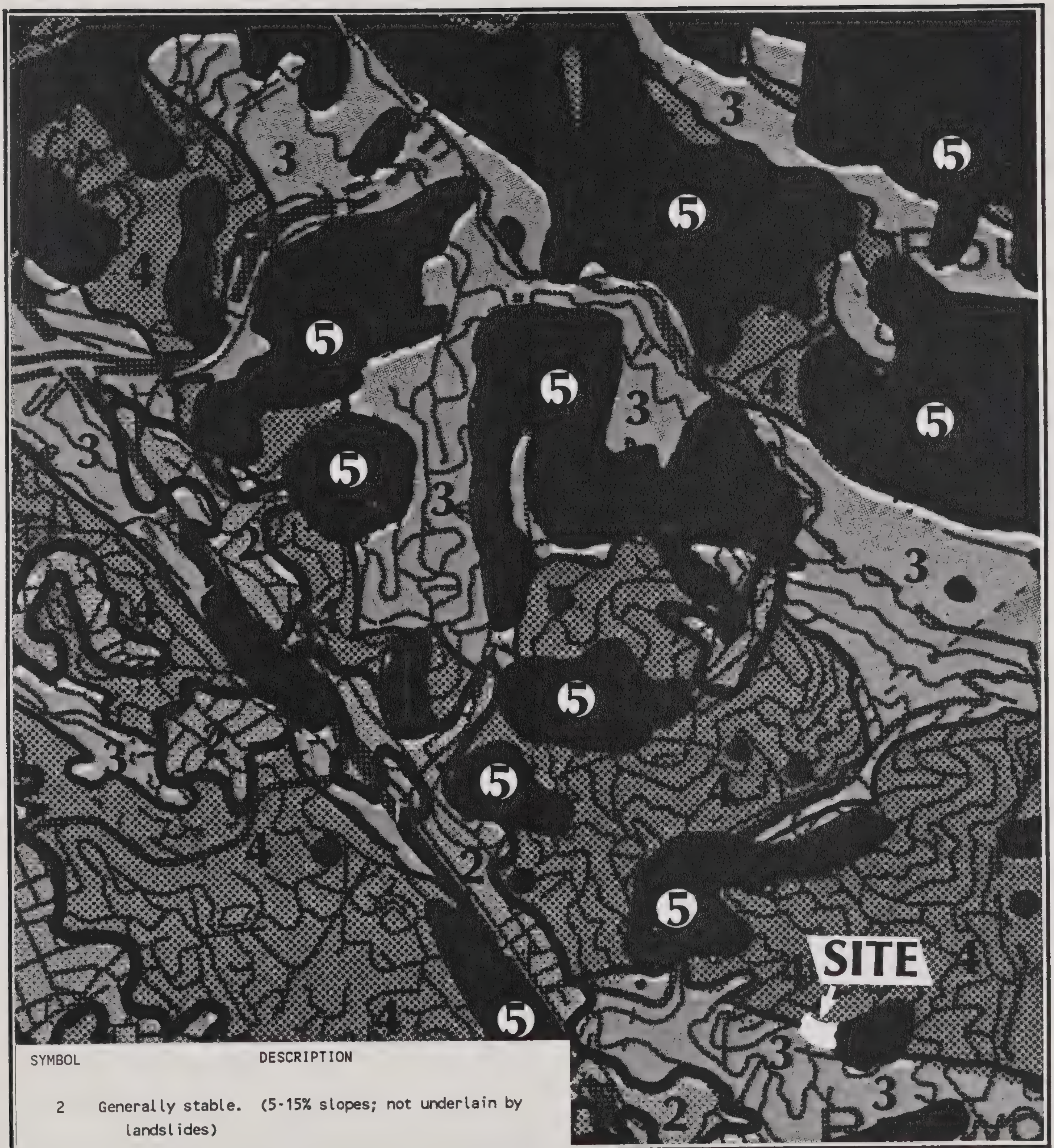
JOB NUMBER: 1007.88



SYMBOL	DESCRIPTION
2	Generally stable. (5-15% slopes; not underlain by landslides)
3	Generally stable to marginally stable. (>15% slopes; bedrock not susceptible to landsliding)
4	Moderately unstable. (>15% slopes underlain by bed-bedrock units susceptible to landsliding)
5	Unstable. (Areas underlain by or immediately adjacent to landslide deposits)

Source: Nilsen, et al (1979)

N

USGS RELATIVE SLOPE STABILITY MAP

SCALE: 1" - 2000'

DATE: 8 - 1 - 88

FIGURE 23.

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JOB NUMBER: 1007.88

Previous Investigations

Don Hillebrandt Associates. In 1978, Don Hillebrandt Associates (DHA) excavated six test pits along the south side of the canyon. According to DHA, sandstone bedrock was present at a shallow depth, and bedding planes in the stone dipped steeply into the hillside. Sandstone bedrock was also encountered in exploratory borings made by Robert McGuire, in 1986, for a house located immediately southwest of the project site.

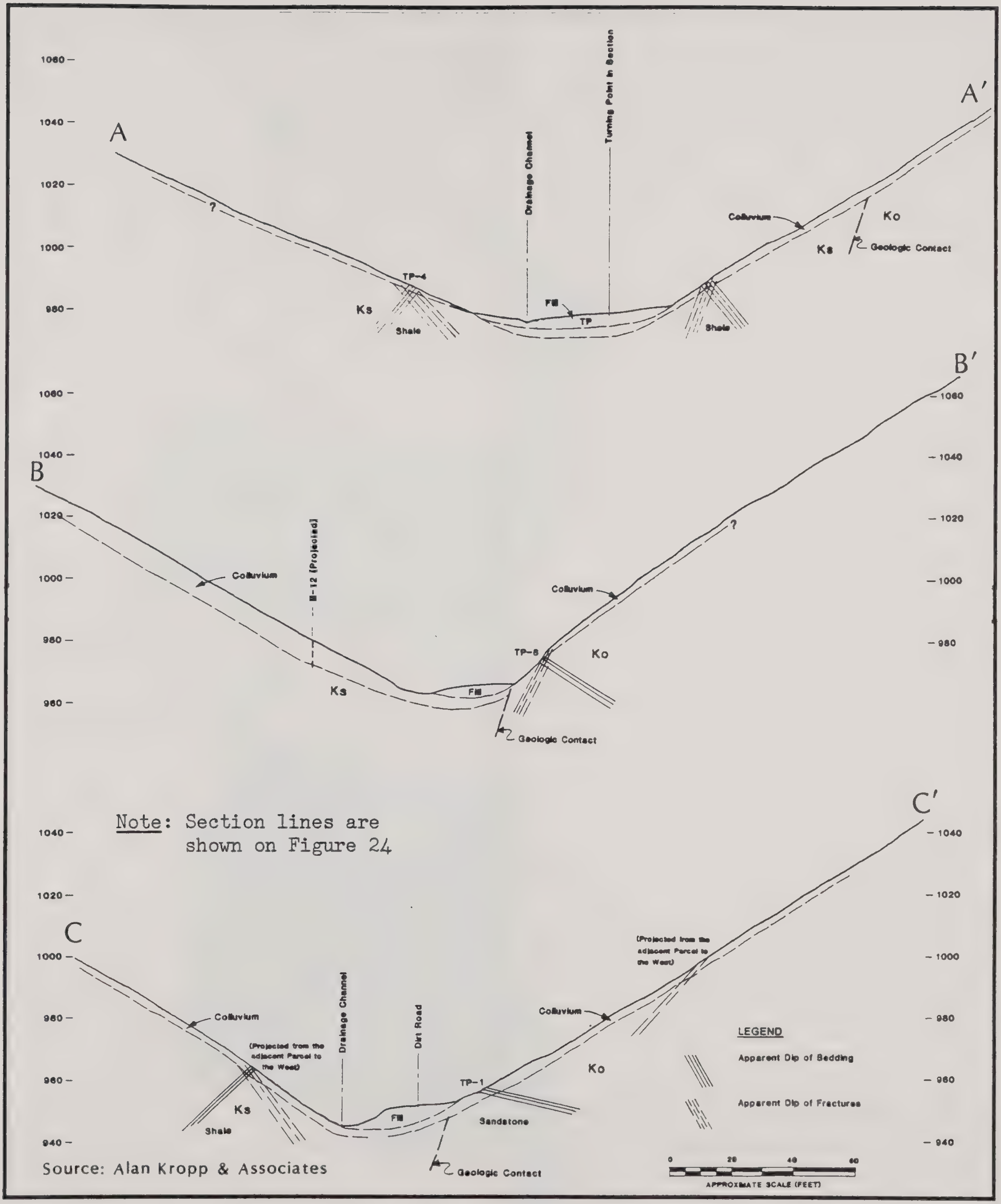
Alan Kropp & Associates. In 1987, Alan Kropp & Associated (AKA) performed a geotechnical investigation for development of the proposed project, and the resulting report was issued during January, 1988. The purpose of this study was to provide recommendations for project-site grading, drainage, and foundation design. The exploratory program consisted of logging 15 borings, which were located on the canyon floor and the lower slopes of the site.

In 1989, supplemental investigation of the site was performed by AKA to develop additional data to evaluate the general geotechnical conditions at the site and to provide additional geologic data for the project EIR. The 1989 investigation focused on providing borings in areas of proposed retaining walls. (The areas proposed for construction of walls represent the planned upper limits of grading and development.) Additionally, backhoe test pits were excavated along the flanks of the valley floor, to provide information on the significant engineering-geology properties of the bedrock (orientation of bedding and jointing, spacing of joints, rock weathering characteristics, etc.).

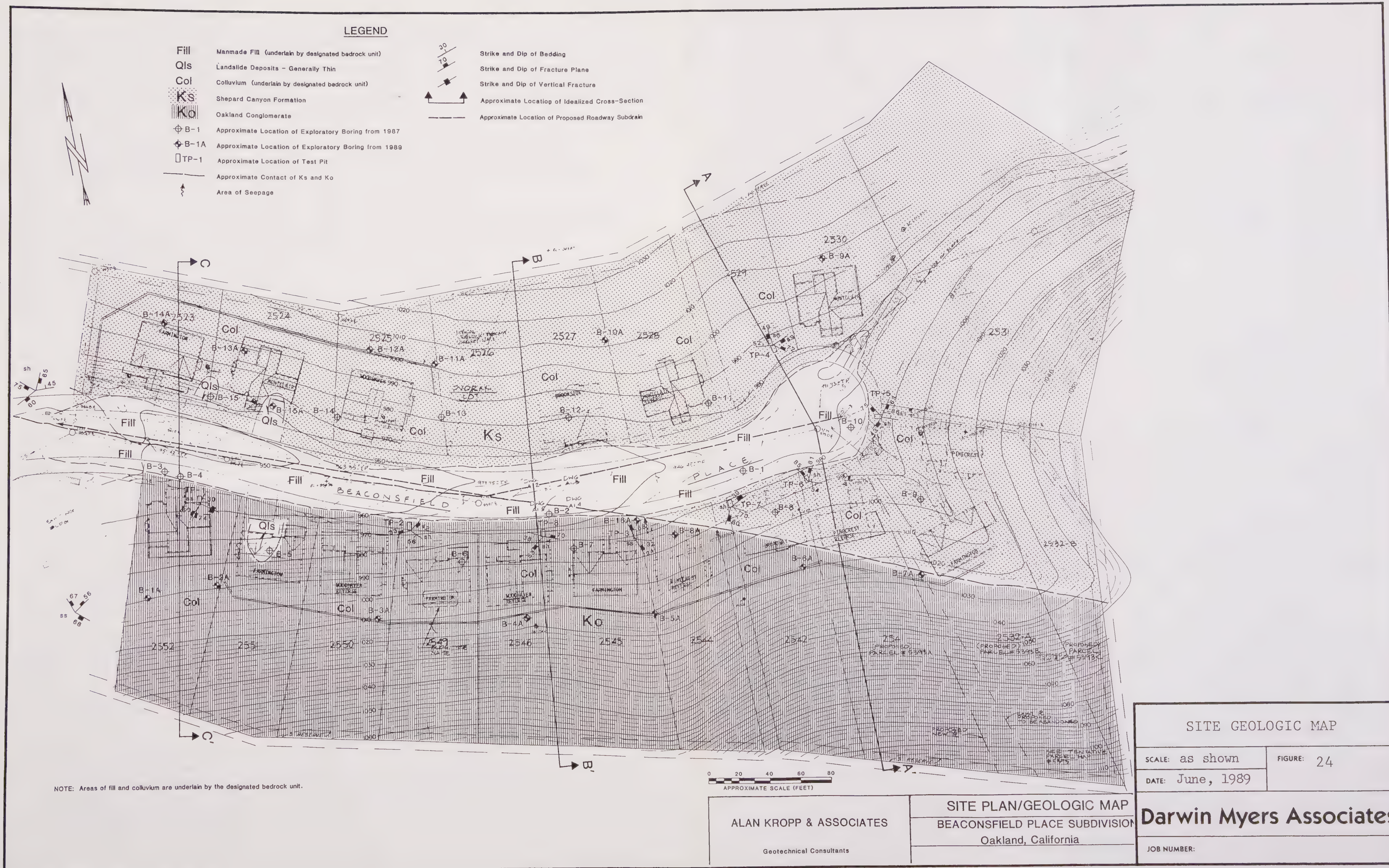
For the 1987 investigation, borings B-1 through B-5 were drilled with a truck-mounted auger, and B-6 through B-15 were made with manually-driven sampling equipment. For the 1989 investigation, borings B-1A through B-16A were made with manually-driven equipment. The locations of these borings and the results of the AKA field investigation are summarized on Figure 24. This figure, which presents an original geologic map of the site, indicates the location of the Ks/Ko contact (Shepherd Canyon Formation/Oakland Conglomerate), shows three small landslides, and indicates the approximate extent of the existing non-engineered fill along the canyon floor.

At the reduced scale of Figure 24, structural information is difficult to read. The full-scale maps in the AKA report indicate that bedding on the south flank of the canyon floor generally dips to the southwest but varies from 38 to 70 degrees. However, at one location, bedding dipped to the east at 30 degrees. On the north flank of the canyon, bedding dips to the north at 52 to 86 degrees. In summary, bedding on the site strikes approximately N67°W and dips are steep (nearly vertical in some areas). The bedrock is highly jointed, and the dominant joint set dips to the southeast at 40 to 60 degrees. However, other joint sets were identified. The orientation of these joints is highly variable. The entire site is mantled by colluvium.

Figure 24 also shows three lines of section, labeled AA', BB', and CC'; these sections are presented in Figure 24-B. The sections indicate that the Ks/Ko contact dips steeply to the north. The fact that the bedding shown does not parallel this contact indicates that the geologic structure is complex. The colluvium that mantles the hillside is shown as having a thickness of six feet, on average, but on the north portion of Section BB', it ranges up to 16 feet in thickness.



IDEALIZED SECTIONS AA′ THROUGH CC′	FIGURE: 24-B	Darwin Myers Associates
	DATE: 6 - 89	JOB NUMBER:


LEGEND
Fill Manmade Fill (underlain by designated bedrock unit)
Qls Landslide Deposits - Generally Thin
Col Colluvium (underlain by designated bedrock unit)
Ks Shepard Canyon Formation
Ko Oakland Conglomerate
B-1 Approximate Location of Exploratory Boring from 1987
B-1A Approximate Location of Exploratory Boring from 1989
TP-1 Approximate Location of Test Pit
Approximate Contact of Ks and Ko
Area of Seepage
Strike and Dip of Bedding
Strike and Dip of Fracture Plane
Strike and Dip of Vertical Fracture
Approximate Location of Idealized Cross-Section
Approximate Location of Proposed Roadway Subdrain
BEACONSFIELD PLACE
NOTE: Areas of fill and colluvium are underlain by the designated bedrock unit.
0 20 40 60 80
APPROXIMATE SCALE (FEET)
ALAN KROPP & ASSOCIATES
Geotechnical Consultants
SITE PLAN/GEOLOGIC MAP
BEACONSFIELD PLACE SUBDIVISION
Oakland, California
SITE GEOLOGIC MAP
SCALE: as shown
FIGURE: 24
DATE: June, 1989
Darwin Myers Associates
JOB NUMBER:

AKA borehole data, summarized on Table 1, indicate that the bedrock consists chiefly of shale on the north wall of the canyon, while the south wall consists of sandstone with minor interbeds of siltstone, claystone, and conglomerate. The shale is described as highly weathered to very-severely weathered, and highly fractured to very-severely fractured. The sandstone is very severely weathered but tends to present better foundation conditions. However, the siltstone and claystone interbeds are weak zones.

The primary conclusion of the AKA report is that the site is suitable for the proposed development. However, a number of potential hazards were identified, including the quality of fill for construction of the proposed street, potential for sloughing of surficial soils, and potential for seismic shaking.

The 1988 AKA report* contains specific recommendations regarding earthwork, drainage, erosion control (including both hydromulching with a tackifier, and the use of slope-protection fabric on slopes steeper than 3:1), foundation and retaining wall standards and criteria, plan review, and construction observation.

The 1989 AKA report* provides an overview of the geotechnical factors influencing design (1989 report, pp. 8-9). The following is a summary of some major points:

1. The inferred depth to competent bedrock in the area of the building sites is less than 10 feet. The cuts that are proposed in the building sites result in removal of most or all of the colluvium and severely-weathered rock.

2. Raising the elevation of the valley floor will not have an adverse effect on stability.

3. An experienced civil engineer or hydrologist should be retained to prepare a new surface-water collection system for the site.

4. Colluvium on the site is loose and subject to soil creep and sloughing when saturated. Therefore, grading outside of building-site areas should be kept to a minimum, and surface water on slopes should be carefully controlled.

5. Tiered retaining walls present potential slope stability problems. Wall configurations should be submitted to the geotechnical engineer prior to performing structural calculations, so that appropriate earth pressure values can be developed. The walls will require subdrains behind them.

The recommendations of the 1989 AKA report are contained in Appendix F. The following summary is to emphasize, not supercede, the principle recommendations of both the 1988 and 1989 AKA reports:

1. All existing fill in the canyon floor should be removed and replaced as engineered fill.

---

* The Alan Kropp & Associates, Inc. (AKA) reports, both entitled "Foundation Investigation, Beaconsfield Place Subdivision, Oakland, California," one dated Jan. 5, 1988 and one dated Apr. 25, 1989 (Supplemental Investigation), are included by reference in this EIR. The reports are available for public review at the City of Oakland Planning Department office, Oakland City Hall. The recommendations from the 1989 report are contained in Appendix F.

TABLE 1.

SUMMARY OF BOREHOLE DATA

BOREHOLE	TOTAL DEPTH (FT.)	DEPTH TO ROCK (FT.)	ROCK DESCRIPTION	COMMENTS
B- 1	8.0	5.5	mw, hf shale	Water at 6 feet
B- 2	8.0	4.5	hw, sf shale	Water at 6 feet
B- 3	4.5	-	-	Possible storm sewer at 4.5 feet
B- 4	8.0	5.0	hw, sf shale	-
B- 5	5.0	3.0	sw, f conglomerate	-
B- 6	5.5	3.0	vsw shale	Conglomerate at 5 feet
B- 7	6.5	5.3	vsw, f conglomerate	-
B- 8	6.0	3.0	vsa, sf shale	Minor conglomerate
B- 9	6.0	3.5	sw, sf shale	-
B-10	3.0	2.5	hw, sf shale	-
B-11	5.0	3.5	sw, sf shale	-
B-12	8.5	-	-	Silty sand (colluvium?)
B-13	6.5	5.5	vsw to hw, sf shale	-
B-14	9.0	8.5	vsw, vsf shale	Sheared zones
B-15	11.0	4.5	vsw, sf shale	Sheared zones
B- 1A	6.0	4.0	vsw, hf shale	Weak rock
B- 2A	6.0	4.5	vsw, (f) sandstone	Weak rock
B- 3A	7.5	3.5	sandstone	Very weak rock
B- 4A	6.0	5.0	sw, sf siltstone	Very weak rock
B- 5A	8.5	7.5	vsw, hf sandstone	Harder at 8 feet
B- 6A	4.5	3.0	vsw sandstone	Harder at 4 feet
B- 7A	4.5	3.5	vsw shale	Very weak rock
B- 8A	7.5	5.5	mw, sf shale	Medium hardness
B- 9A	4.5	3.0	mw to sw, siltstone	Medium hardness
B-10A	4.0	2.0	mw to sw claystone	Medium hardness
B-11A	6.0	5.0	sw, hf shale	Weak rock
B-12A	7.5	5.0	vsw shale	Very weak rock
B-13A	5.5	4.0	sw, hf shale	Medium hardness
B-14A	4.5	3.5	sw, hf shale	Medium hardness
B-15A	7.5	6.0	vsw sandstone	Weak rock
B-16A	6.0	4.0	mw sandstone	Medium hardness

Explanation of Abbreviations:

nw = moderately weathered
hw = highly weathered
sw = severely weathered
vsw = very severely weathered

(f) = fractured
hf = highly fractured
sf = severely fractured
vsf = very severely fractured
f = friable (weakly consolidated)

2. Grading should not be performed during the winter rainy season. Temporary excavations for walls should be shored, as required, to prevent slope failure.

3. For planning purposes, cut slopes in severely-weathered bedrock and soil may be as steep as 2:1; in moderately-weathered bedrock, gradients as steep as 1.75:1 are permissible. (The AKA report notes that at the time of grading, the geotechnical engineer would determine which, if any, areas are suitable for slopes of 1.75:1.)

4. Eight wide drainage-terraces are recommended at 25 feet vertical, provided with concrete "V" ditches.

5. If fills are proposed in areas of 5:1 (or greater) slope, "keyways" are recommended.

6. A subdrain is recommended on the centerline of the valley floor.

7. Positive surface drainage is recommended throughout the development. Roof-gutter water should be intercepted by a closed conduit and conveyed to the storm drainage facilities in the street.

8. Graded slopes should be protected from erosion by use of slope-protection fabric, in combination with hydromulching and hydroseeding.

9. Foundation recommendations are provided.

10. General recommendations are provided for retaining wall design. These include a requirement for a one-foot width of drain rock (<u>not</u> native soil) wrapped in a polyester, non-woven geotextile, behind the walls. A perforated plastic pipe should be used to convey runoff from the walls to the roadway storm-drainage facilities.

<u>Grading Concept</u>

The applicant's submittal does not include a grading plan. The Overall Site Plan, Figure 5, page 8, shows partial topography for the site. (The 1989 AKA report contains a full-scale plan showing full site topography.) The Development Site Plan, Figure 6, page 8, shows the locations of the proposed tiered retaining walls and topography for the proposed street. A note on this plan indicates that the slope areas more than three feet above the walls would not be disturbed. Figure 7, page 8, provides sample sections through the development area of the site, with house foundations, retaining walls, and roadway fill; and a street profile showing roadway fill.

The applicant plans to excavate approximately 12,000 cubic yards of material from the lower slopes of the site, below the proposed retaining walls, and place the excavated material as roadway fill along the canyon floor. The maximum depth of fill would be close to 20 feet; the maximum depth of cut would be about 18 to 20 feet. The tiered retaining walls supporting the upslope cuts would each range in height up to six feet. Beyond the end of the Beaconsfield Place right-of-way, the canyon fill would extend about 80 feet up into the creek which enters the site from the northeast. The fill will widen the canyon floor somewhat and provide gently-

sloping grades between the curbs and the front walls of the houses. The houses would have stepped foundation cuts into the bedrock and overlying colluvium. It is understood that on lots which do not have upslope retaining walls, earthwork will be limited generally to foundation areas.

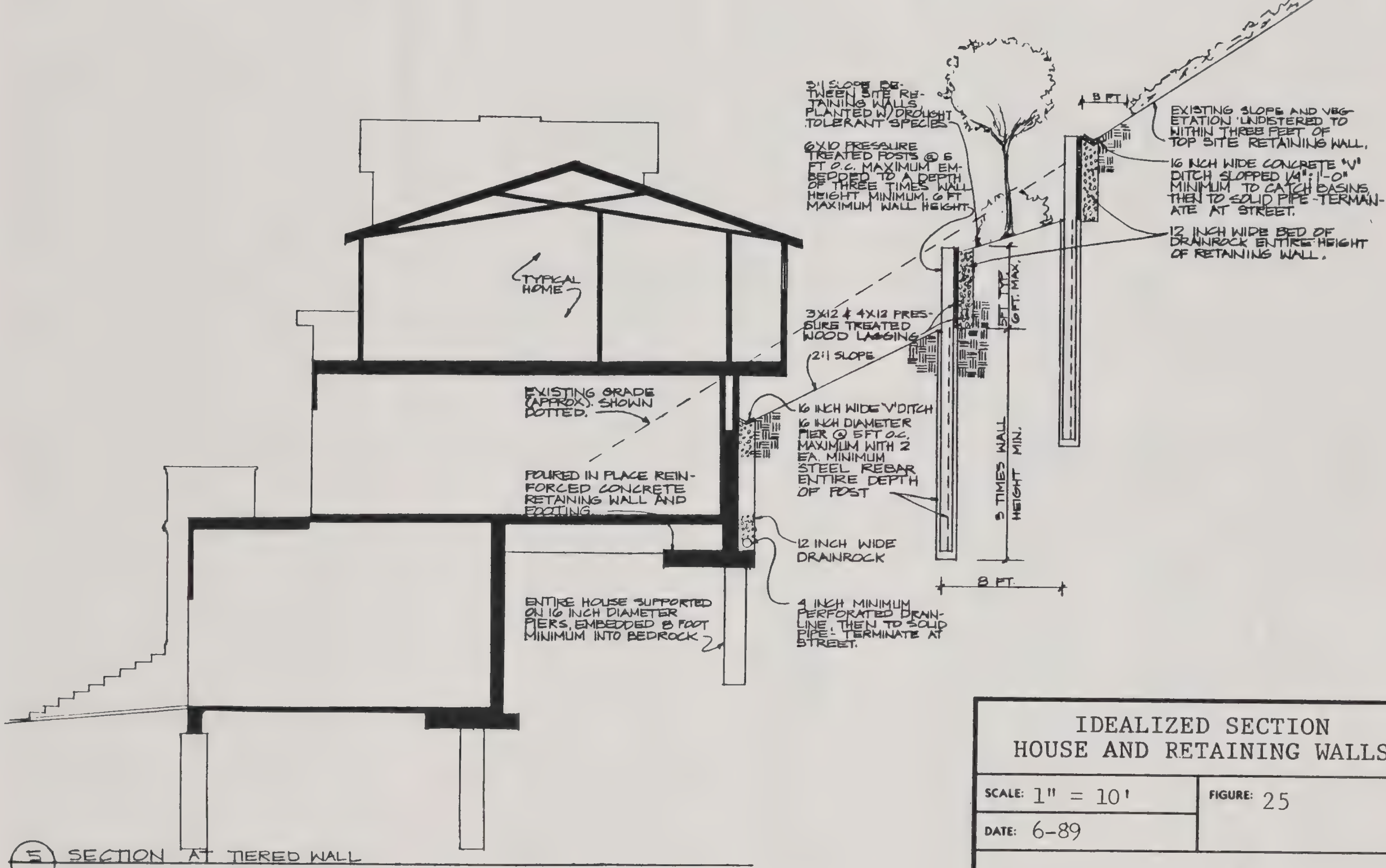
Figure 25, provided by the applicant, is an idealized section through a project unit, with a tiered wood retaining wall at the rear. The house is founded on 16-inch-diameter concrete piers embedded a minimum of eight feet into bedrock. The concrete retaining walls of the house are up to eight feet in height, with a subdrain and concrete "V" ditch, for drainage, behind the upper wall. Behind the house is a six-foot-high, 2:1 cut slope, with the lowest of the tiered retaining walls at the top of the cut. It is proposed that the retaining-wall posts be 6" x 10" pressure-treated wood, anchored to concrete piers. The concrete piers would each have two steel reinforcing-bars, and would have depth equal to three times the height of the wall. Figure 25 does not specify the spacing of the concrete piers/wooden posts, but Figure 6, page 8, shows them at five-foot intervals. The tiered walls would be eight feet apart, with a slope gradient of 3:1 in the intervening area. It is proposed that drought-tolerant trees be planted in this area by the developer. The wood lagging (boards) behind the retaining-wall posts would be 3" x 12" and 4" x 12" pressure-treated wood. Both walls would be backed by a 12-inch-wide bed of drain rock, and there would be a concrete "V" ditch at the top of the upper wall, to collect surface flow from the upslope area. Based on borehole data in the AKA geotechnical report, the material to be supported by the walls is likely to consist mainly of soils, colluvium, and very-severely-weathered rock.

Submitted plans do not indicate slope gradients in side-yard areas. However, Figure 25 indicates a typical vertical distance of 25 feet between first-floor house elevation and the proposed ground surface at the base of the lower retaining wall. Because the front of the house is 50 feet from the wall, the side-yard slope can be inferred to be a 25-foot-high, 2:1 slope.

It is estimated that the area of major earthwork which would be required to develop the site as proposed would involve about one-half of the approximately 4.8 gross acres of the site. It is proposed that house construction be spread over a period of several years, with four to six houses being built during each of three construction phases. First-phase house construction would be undertaken immediately after completion of overall project improvements (street, major grading, drainage, retaining wall, and utility work). Lots which would be scheduled for second- and third-phase house construction would be graded to the point of "lot stability" and would remain in that state until such time as later phases of house construction were undertaken.

<u>Beaconsfield Place Fill</u>

Beaconsfield Place, between Chelton Drive and Keswick Court, appears to have been built on fill. Cracking along the outer edge of the downslope lane indicates that the fill may be settling. The City has sealed the cracks but there is no evidence that any major repair work has occured recently. The extent of this problem is not known, and although it does not relate directly to development of the project site, it is possible that this condition could be affected by heavy-vehicle construction traffic and long-term project and neighborhood traffic.



IDEALIZED SECTION
HOUSE AND RETAINING WALLS

SCALE: 1" = 10'	FIGURE: 25
DATE: 6-89	

Darwin Myers Associates

JOB NUMBER:

D. ENERGY

Development of the proposed project will involve direct use of energy for construction and indirect use for production of materials. Long-term energy input will be required for the operation of households and maintenance of community facilities. Based on a 20-year study period, the most substantial non-transportation use of energy for the project will be household operation (heating, cooling, lighting, appliance operation, etc.). This is estimated at about two-thirds of total, long-term, non-transportation energy use. The remaining energy use will mostly be in project construction, with relatively minor 20-year input required for maintenance of community facilities. (See calculations of estimated energy input, in Appendix G.)

The estimated 20-year level of energy consumption for the project is not unusual for the level of development proposed. Therefore, the project will not have significant impact on energy resources, although it will contribute to long-term, incremental demand. (Although the project is not expected to have significant energy-use impact, efforts should be made to limit long-term energy consumption. Appendix G contains a list of possible energy-conserving methods which should be considered in conjunction with final project design.)

E. AIR QUALITY

The project site is located in an extensive, developed residential area with no major stationary air-pollution sources. Within the overall air basin, project traffic would contribute to long-term, cumulative air pollution but would not independently result in significant air-quality impact.

Air-quality impacts during construction, particularly during the relatively-heavy, first-phase construction period, have the potential to be a periodic nuisance for surrounding neighbors. Dust control during construction is under the purview of the City, through standards specified in development regulations or otherwise imposed on construction procedures. If the project goes forward, the City should pay particular attention to the need for dust control during development, through conditions attached to the grading permit and other permits, and regular site inspection while earthwork is underway.

F. DRAINAGE

Existing Drainage System (Figs. 26 and 27)

The project site and the area which drains into the site comprise an overall watershed of approximately 75 acres, which includes the upslope area to the east which is generally bounded by Chelton Drive, Wilton Drive, and upper Ascot Drive. The primary drainage channel associated with the site is an unimproved creek which enters the northeast corner of the site and drains to the east end of the existing dirt road on the site's canyon floor. At this point, creek runoff enters an old metal drain pipe which has been placed in a ditch along the north side of the dirt road. This pipe drains to a vertical pipe (riser), with a trash rack (debris catcher), which is located near the west site boundary. From there, the runoff is to a catch basin (drop inlet) located in the end of paved Beaconsfield Place, just off-site to the west; then through a 30-inch reinforced concrete pipe under Keswick Court. The Keswick Court pipe outfalls onto a concrete apron at the west end of the court, which drains into a short stretch of steep, rocky canyon, which flows southwest to the downstream system.

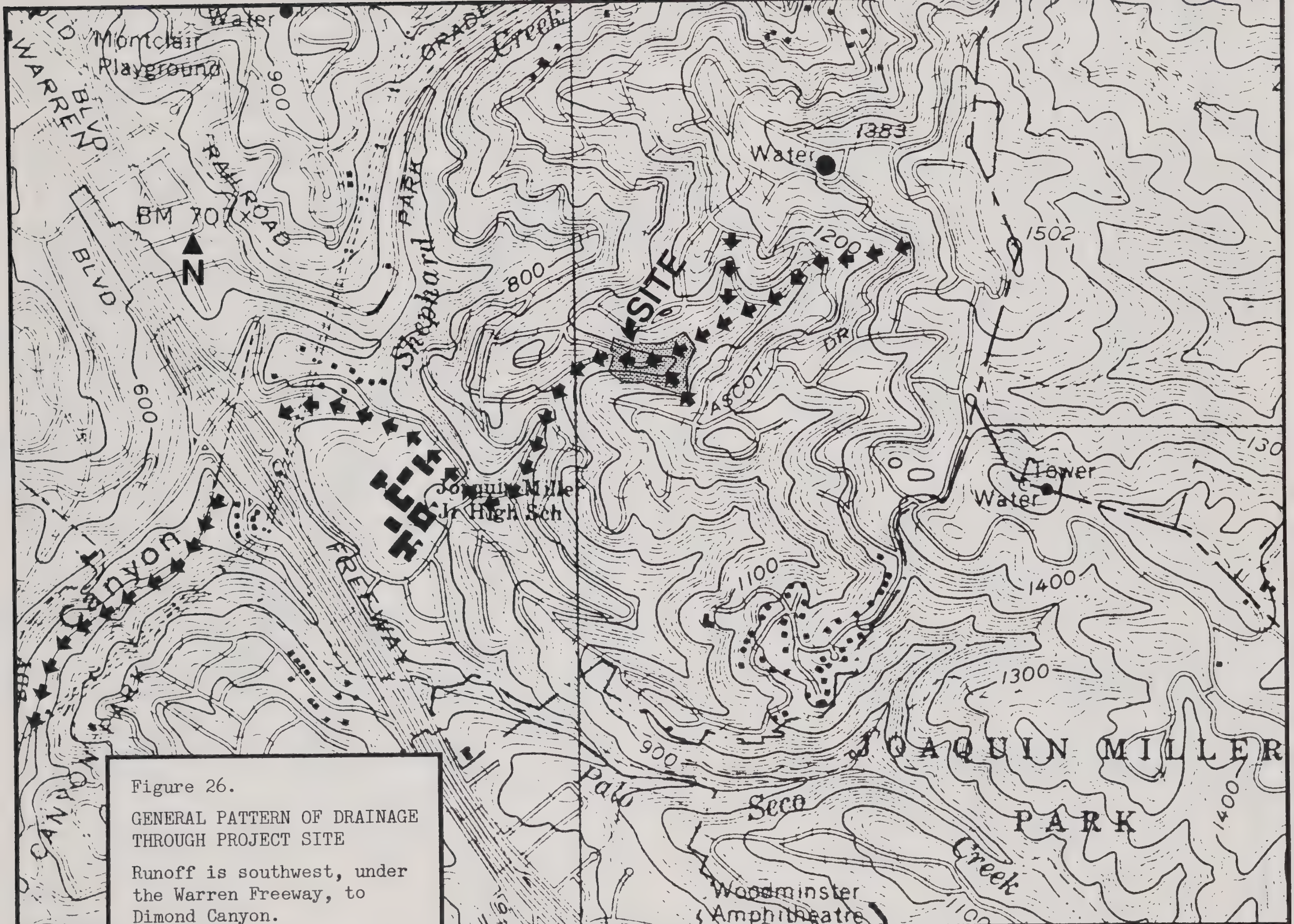


Figure 26.

GENERAL PATTERN OF DRAINAGE THROUGH PROJECT SITE

Runoff is southwest, under the Warren Freeway, to Dimond Canyon.

Scale: 1" = 1,000'

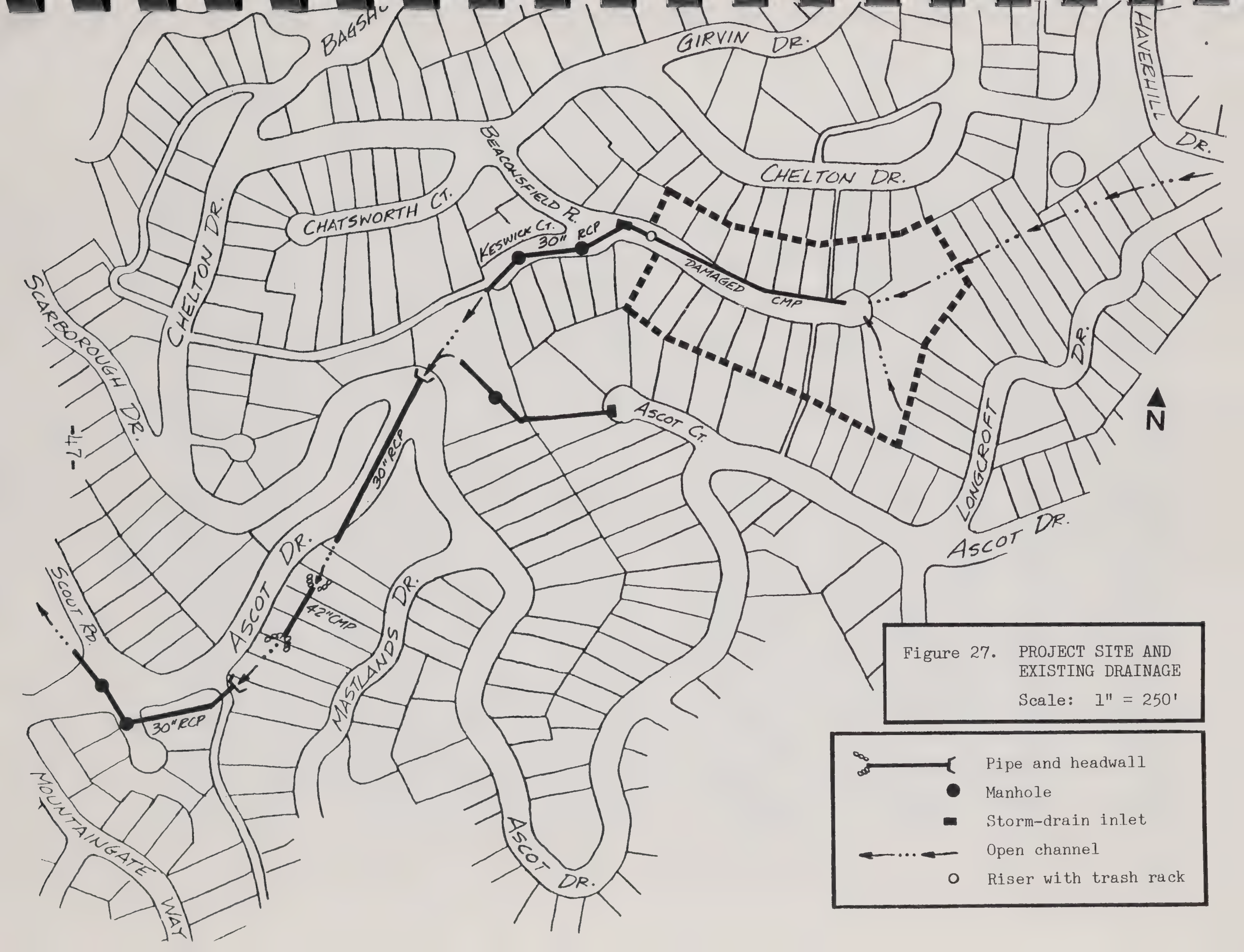


Figure 27. PROJECT SITE AND EXISTING DRAINAGE
Scale: 1" = 250'

A short, secondary channel, a shallow swale, enters the southeast corner of the site and drains toward the end of the dirt road. The site also receives overland runoff from the abutting residential lots upslope to the north and south.

Project Runoff and Proposed Drainage System

The applicant's engineer has prepared a preliminary drainage study and a preliminary drainage plan, which are contained in Appendix H. The primary drainage facilities proposed are the following:

1. A 30-inch pipe in the north side of the project street, which would replace the old, existing pipe in the canyon floor. This pipe would extend from a headwall near the northeast site boundary (Fig. 6, p. 7), westward down the alignment of the creek which enters the site from the northeast, under the north side of the project street, to the existing storm-drain inlet just off-site to the west. This existing, off-site inlet will also receive runoff from the gutter along the north side of the project street (Fig. 5, p. 7).

2. A new storm-drain inlet on the south side of the west end of the project street, with a 12-inch pipe connecting to the existing catch basin just off-site on the north side of the street (see preliminary plan in Appendix H). This new inlet would collect runoff from the gutter on the south side of the street. Thus, both of the new pipes, the 12-inch and the 30-inch, would drain into the existing 30-inch pipe which extends under Keswick Court.

As indicated in the project engineer's drainage study, in Appendix H, the proposed 30-inch pipe would be adequate to accommodate runoff from the project-area watershed during a 15-year storm. The calculated flow during such a storm would be 61 cubic feet/second (cfs) entering the pipe, at the northeast corner of the site. With this volume, the depth of flow would be about 1.6 feet within the 2.5-foot (30") pipe, or about 60% of capacity.

With ultimate 20-unit development of the project site, storm runoff from the site, below the headwall of the proposed 30-inch pipe, would be about 2% of the 69 cfs which the project engineer predicts will enter the existing catch basin just off-site to the west, during a 15-year storm. It is estimated that runoff from the undeveloped site (and adjacent upslope areas) would be about 0.6 cfs, while runoff from the developed site would be about 1.3 cfs (about 2% of total 69 cfs at the west site boundary). Thus, runoff from the developed site would result in only a minor increase in overall runoff in the site's drainage area, and would have no significant impact on the downstream system. (See developed/undeveloped runoff calculations, by E. Franzen, civil engineer, in Appendix H.)

No details of the project's secondary drainage system--which would accommodate overland flow from off-site, across the residential lots, and concentrated flow from the residential improvements--have been submitted. The project cross-sections (Fig. 7, page 9) show concrete "V" ditches along the tops of the proposed retaining walls and at the back walls of the houses, and sub-drains behind the foundation walls of the houses, but there is no information indicating how flow from these facilities would be conveyed to the proposed storm-drain system in the project street.

The applicant's geotechnical reports, by Alan Kropp & Associates, contain a number of recommendations regarding project drainage, which should be followed in preparation of final drainage plans. (See 1989 report recommendations in Appendix F.)

Water Quality

Project development will involve a large area of earthwork, including the cutting of steep slopes. With phased house construction, some graded house sites would remain undeveloped over a period of several years. For these reasons, special attention will have to be paid to construction and erosion control, to preclude erosion hazards and downstream siltation. (The Alan Kropp & Associates report mentioned above contains erosion-control recommendations which should be followed in preparation of the final grading plan.)

Development of the project would result in a long-term, cumulative decrease in downstream water quality, as a result of vehicle lubricants, gardening chemicals, and other commonly-used substances being washed into the storm-drain system. However, because the level of site occupancy would be minor relative to that of the overall drainage area, the project would not individually result in significant impact on water quality.

G. NOISE

Existing Noise Levels

There are currently no significant noise sources impacting the project site. To determine the ambient noise levels on the project site and at surrounding residential areas, continuous recordings of sound levels were made at the end of Beaconsfield Place on June 1 and 2, 1988, for a total period of eight hours, during representative hours of day and night periods. (The sound-level measurements were made with a Gen Rad Company Community Noise Analyzer, which provides a series of descriptors of sound levels versus time, commonly used to describe community noise.) Table 2 provides a summary of the recording results--minimum and maximum levels; the L_{10}, L_{50}, and L_{90} descriptors (levels exceeded 10%, 50%, and 90% of the time); and the continuous equivalent level. The continuous equivalent level (L_{eq}) values are used to calculate the day-night level (L_{dn}), which is a 24-hour noise descriptor used by local agencies to describe community noise impacts. (See Appendix I for definitions of terminology, noise standards, and study instrumentation.) The calculated L_{dn} for the project site, under existing conditions, is 51 dB, a level which is typical for quiet suburban areas.

A review of the measured noise levels, and field observations, indicate that there are no major noise sources at the project site. The existing noise environment is controlled by noise from surrounding properties, traffic on adjacent roadways, occasional aircraft overflights, and other, miscellaneous sources. As shown on Table 2, the L_{eq}'s ranged from 42 to 52 dBA during the daytime, and from 39 to 47 dBA during the nighttime.

Noise Standards

The City of Oakland has applied the standards of the U.S. Department of Housing and Urban Development (HUD), CFR Title 24, to single-family residential projects, with regard to non-construction related noise impacts. The HUD standards specify exterior noise levels of up to 65 dB L_{dn} as acceptable for residential land use--with a goal of 55 dB L_{dn}, and an interior noise limit of 45 dB L_{dn} for living spaces.

TABLE 2.

Noise Levels Measured at the End of Beaconsfield Place

Time Period		Noise Levels, dBA					
		Lmax	L10	L50	L90	Lmin	Leq
8:00-9:00 am	(daytime)	51	51	40	36	33	57
9:00-10:00 pm	"	74	48	38	35	32	52
10:00-11:00 am	"	75	46	38	34	31	47
11:00 am -12:00 noon	"	75	49	38	35	33	48
9:00-10:00 pm	"	59	38	33	32	30	42
10:00-11:00 pm	(nighttime)	64	34	31	30	29	40
11:00 pm-12:00 mdnt.	"	67	34	31	30	29	40
12:00-1:00 am	"	65	34	30	30	28	39

TABLE 3.

Construction Phases, Duration and Types of Equipment

Construction Phase	Duration	Equipment Used
1. Site Clearing	1 week	Front-end loader Dozer Compactor Dumptruck
2. Earthwork	3 weeks	Front-end loader Dozer Compactor
3. Retaining Wall	4 weeks	Backhoe Dumptrucks
4. Utilities	3 weeks	Backhoe Dumptrucks
5. Street Improvements	3 weeks	Dozer Compactor Paving Machine Rollers Dumptrucks Concrete Mixer
6. House Construction		
a. Foundation	2 mo./unit	Hand Tools
b. Erection	4-6 mo./unit	Cement Mixers

(Note: more than one unit may be constructed at one time)

The City's Noise Ordinance does not apply to construction noise because such noise is considered to be a short-term, one-time-only impact. Construction vehicles such as dump-trucks and delivery trucks are subject to the noise regulations of the California Department of Motor Vehicles, which regulates noise generated by vehicles with gross weight in excess of 10,000 pounds, to 86 dBA at speeds less than 35 mph and to 90 dBA at speeds greater than 35 mph, at a distance of 50 feet. There are currently no standards for construction equipment that does not operate on public roadways, such as dozers and front-end loaders.

Noise Sources

The noise impacts associated with the project will be short-term impacts from construction and long-term impacts from new residential activity and increased traffic on local roadways.

Construction Noise. Noise impacts from project construction will vary considerably, depending on the phase of construction, the types of equipment being used, and the length of time each phase requires. Based on information provided by the applicant (Appendix E), project development has been divided, for analytical purposes, into six distinct phases, where the combination of equipment and tasks is expected to result in fairly consistent ranges and maximums of noise. The phases are 1) site clearance, 2) major earthwork, 3) retaining-wall construction, 4) utilities installation, 5) street construction, and 6) house construction. During each phase, except house construction, the noise impacts will result from the use of heavy equipment, including dozers, front-end loaders, backhoes, and trucks. House-construction noise will result primarily from the use of hand tools such as hammers and power-saws, with occassional vehicle noise resulting from delivery trucks and smaller construction equipment engaged in foundation construction and other minor earthwork. (Table 3 shows the durations and equipment types anticipated for each of the six phases.)

To predict the construction-noise impacts of the project, construction-activity noise data documented by the U.S. Environmental Protection Agency were used to establish noise levels generated by individual pieces of equipment and by various, general construction processes. Table 4 shows average noise levels produced by house construction and by several types of construction equipment which are expected to be used for project development.

During project construction, it is anticipated that equipment will be operating during all or part of 8½-hour work-days (8:00 a.m. to 4:30 p.m., Mondays through Fridays). The noise levels generated during any construction phase will depend on which types of equipment are operating, the number operating simultaneously, and the daily period of time they are operating.

In order to express noise in terms of the day-night level (L_{dn}), it is necessary to consider the duration of construction noise relative to daily time without such noise, over a 24-hour period. Thus, the conditions shown in Table 2 were used to approximate ambient noise levels during times when construction would not be occuring. Also, noise impacts on a single receptor, such as a residence, will vary over time, depending on the locations of construction equipment. Noise from construction equipment dissipates at a rate of 6 dB for each doubling of distance from the source. Thus, as equipment moves farther from a receptor, noise levels will decrease. Attenuation factors have been included in the predicted noise levels, to account for such variations in noise levels over time.

TABLE 4.

Average Noise Levels Produced at a 50 Ft. Distance from Construction Equipment or Activities

Equipment or Activity	Average Noise Level, dBA
Backhoe	85
Concrete Mixer	85
Dozer	80
Front-end Loader	79
Paving Machine	89
Roller or Compactor	74
Truck	91
House Construction:	
a. Foundations	81
b. Erection	65

TABLE 5.

Construction Noise Impacts on Nearest Residences

	Exterior Noise Levels, dB Ldn	
	Nearest House Beaconsfield Pl.	Houses on Ridge Chelton Drive
Site Clearing	80	67
Earthwork	77	64
Retaining Wall	81	68
Utilities	79	66
Street Improvements:		
a. Laying Baserock	79	66
b. Paving	87	74
c. Curb & Gutter	71	58
House Construction:		
a. Foundations	76	63
b. Erection	60	47

The residences most likely to be impacted by project construction noise are the house near the project entrance, at 2639 Beaconsfield Place, and the houses along Chelton Drive, on the ridge above the northerly site boundary. The house on Beaconsfield Place is located about 20 feet west of the most westerly project lot on the south side of the street, and therefore will be subject to the greatest noise impact. Houses along the northerly boundary of the site are at an average of about 160 feet from the center-line of on-site Beaconsfield Place. Noise levels at these locations have been predicted, for each phase of construction, using the criteria discussed above, and are presented in Table 5.

Exterior noise levels at the nearest house, 2639 Beaconsfield Place, will vary from 60 to 87 dB L_{dn} during the construction process. The highest noise levels will be generated during street paving, which is expected to occur over a two-day period. The lowest levels will occur during house construction, after foundation work has been completed. House construction will involve considerably longer periods--four to six months for each of three phases--than the heavier, overall site development. Other construction phases will create noise levels in the high-70- to low-80-dBA range, and will occur over a one- to four-week period.

To predict the interior noise levels for these houses, a reduction of 15 dB was applied to the exterior levels, to account for the attenuation provided by the building shell, under annual average conditions. The annual average condition assumes that windows with single-strength glass are maintained open for up to 50% of the time, for natural ventilation. Thus, interior noise levels for the house on Beaconsfield Place will vary from 45 to 72 dB L_{dn} during the construction process.

Houses on the ridge north of the site will have exterior noise levels varying from 47 to 74 dB L_{dn} during project construction. These levels are 13 dB lower than those predicted for the house on Beaconsfield Place, and indicate the effect of distance on noise attenuation. Interior noise levels for these houses will vary from 32 to 59 dB L_{dn} during construction. Other houses in the immediate vicinity of the project site are located at various distances up to 600 feet from the site, and thus will experience noise levels as much as 11 dB lower than those expected along the ridge.

Residential Noise. When construction is completed, long-term noise will result from project-generated traffic and from miscellaneous sources normally associated with residential areas, such as power tools, dogs, and various outdoor activities.

With ultimate 20-unit development, the project site is expected to generate 240 vehicle trip-ends/day, based on an average trip-generation factor of 12 trips/day/unit. Based on noise-prediction methods developed by the Highway Research Board, noise levels created by this volume of traffic will be low enough that they will not raise the area's ambient levels by more than 0.5 dB at most surrounding properties. At the existing house on Beaconsfield Place, however, a 2-3 dB increase in ambient L_{dn} may occur due to the proximity of the house to the roadway. (The project's 240 trips/day are expected to have minor noise impact, on the order of 0.5 dB, along the Chelton Drive route to the site.)

Noise from other residential activities is difficult to quantify, and is, of course, highly dependent on the residents. However, if it is assumed that project residents will generate noise levels comparable to those generated by surrounding residents, the area's measured ambient levels can be used to predict the impact from the future project-site residents, based on the distances and number of houses

surrounding the project site. Evaluation of these levels indicates that the ambient Ldn could increase by 2 to 3 dB at the surrounding residences, due to project residents, resulting in ambient noise levels of 53 to 54 dB L_{dn} for the project and its vicinity. These levels, however, are within the 65 dB L_{dn} limit specified by HUD, and also meet the exterior noise goal of 55 dB L_{dn}.

For houses surrounding the project site, interior noise levels resulting from project-site occupancy will be in the range of 38 to 39 dB L_{dn}, based on the average annual condition as described above. These levels are within the 45 dB L_{dn} interior limit of the HUD standards.

Noise Impacts and Mitigation

With development as proposed, long-term project-site noise generation would result in relatively minor increases in the project area's ambient noise level. Because it is not anticipated that post-development noise levels would be great enough to exceed City of Oakland/HUD standards for average interior/exterior residential noise, long-term project occupancy is not expected to result in significant noise impacts.

Based on analysis of potential project-construction noise, it is expected that noise-level excesses will periodically occur while the project is being developed, particularly during first-phase site improvement. However, because construction activities, even if phased, would occur over a relatively short period, noise impacts from construction can not be considered significant. Although construction noise would not have long-term significance, it is subject to a number of controls which would limit short-term, nuisance impacts. These controls include the use of quiet, or "new technology," equipment. The greatest potential for noise abatement of construction equipment is the quieting of exhaust noises by the use of improved mufflers. Thus, it is recommended that all internal-combustion equipment used for project construction be equipped with a type of muffler recommended by the manufacturer. Also, all equipment should be in good mechanical condition, to minimize noise generated by faulty or poorly-maintained engines, drive-trains, and other components. Noisy construction operations should be scheduled for daytime hours between 7:00 a.m. and 7:00 p.m., to avoid sensitive evening and early morning hours. It should also be possible for construction workers to maintain modest volume for their favorite radio entertainment.

Although the applicant has indicated that the various phases of project house-construction are proposed to be random, it would probably be beneficial to the neighbors to have the sequence of phased construction proceed from one end of the project street to the other, to preclude noise generation from all parts of the site during each phase of house construction. If this were done, it would be desirable to to have the first phase of house construction occur on the west end of the street. This would minimize the duration of overall construction-noise impacts on the residence at 2639 Beaconsfield Place, and other, nearby houses. It is also possible that new units at the west end of the project street would provide some degree of attenuation of noise generated by later phases of house construction farther to the east.

(Note: Some project neighbors have expressed concern about the extent to which the project site's canyon terrain would amplify noise generated by the developed project. Due consideration was given to this concern during preparation of the EIR noise analysis prepared by Edward L. Pack and Associates, Inc., Acoustical Engineers.)

H. VEGETATION AND WILDLIFE

Vegetation (Fig. 28)

The project site has three vegetation types--north coastal scrub, introduced pine/cypress forest, and riparian. A substantial portion of the site, possibly 15-20% of the total area, adjacent to the dirt track along the canyon floor, has been cleared of major vegetation. The natural creek channel has mostly been filled and culverted. Vegetation clearance was done primarily in areas of north coastal scrub and riparian zones. Slash from the clearing has been placed in a strip along the former creek bed, along the north side of canyon-floor dirt road. Clearing was done on both sides of the canyon, extending upslope 70 to 100 feet, and extending from the westerly property line to the east end of the dirt road, where the canyon-creek enters the site from the northeast.

The north coastal scrub covers most of the project site, and is found on both the north- and south-facing slopes of the canyon. In the scrub area, plant-species composition varies depending on the slope exposure. Vegetation on the north-facing slope is typical of less-exposed, more-moist conditions. Above the cleared area, the scrub is dominated by poison oak, creambush, and Himalaya berry. These form an impenetrable thicket extending to the south boundary of the site. Within this thicket, there are coast live oaks and tree-size blue elderberry. The cleared area of the north-facing slope is dominated by cow parsnip, with smaller patches of Himalaya berry and nettles, and California manroot is common along the upper edge of the cleared area. The vegetation clearance involved the cutting of about 20 bay trees which are now stump-sprouting, with some of the sprouts reaching several feet in height.

The plant-species composition of the coastal scrub on the south-facing slope reflects the more exposed, drier, south-facing conditions. The undisturbed scrub is open baccharis/poison oak brushland, with several small coast live oaks. The understory is dominated by introduced annual grasses, predominately brome grasses and scattered examples of poppy, mint, and monkeyflower. The cleared portion of this slope is dominated by annual grasses and cow parsnip.

The undisturbed streambed at the northeast corner of the site is dominated by cottonwood and bay, with an understory dominated by Himalaya berry, blue elderberry, French broom, and creambush. Herbaceous-layer species are primarily California manroot, poison hemlock, bedstraw, and miner's lettuce, with isolated clumps of milk thistle and introduced herbs.

The Monterey pine/cypress forest is found on both the north- and south-facing slopes. Both species are introduced. There is a broadly-scattered stand of Monterey pine above the scrub area of the south-facing slope. This stand has an understory of introduced ornamental plants and annual grasses. At the east end of the site, at the end of the dirt road, there is a stand of mature Monterey cypress. These trees have a dense canopy, and as a result of the heavy shade, the understory is relatively sparse. Understory species include bedstraw, introduced annual herbs, and ferns.

No rare or endangered plant species, as listed by the State and Federal governments, have been recorded or observed on the project site.

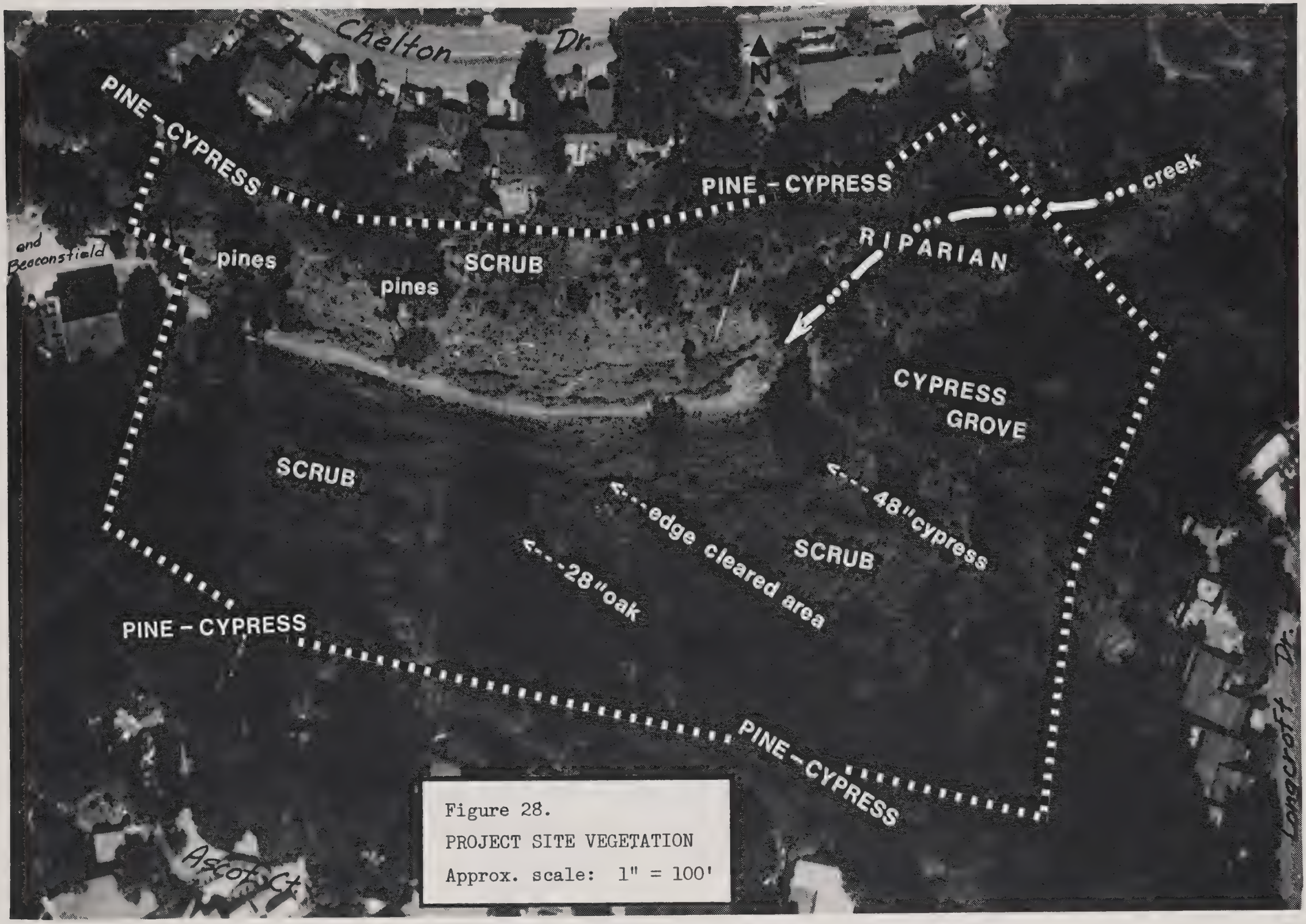


Figure 28.
PROJECT SITE VEGETATION
Approx. scale: 1" = 100'

Wildlife

Wildlife on the project site exists in association with the site's plant communities or habitat types. Depending on specific species requirements, wildlife species may utilize several habitat types or be restricted to one type.

The site contains four basic habitat types: the open coastal scrub on the south-facing slope, the dense coastal scrub on the north-facing slope, the riparian woodland in the northeast area of the site, and the introduced stand of Monterey pine and cypress at the east end of the site. Most species are not dependent on a single habitat type. The greatest value of any of the habitat types is in providing a portion of the total habitat requirement of many species.

Because of the proximity of the site's varied habitats, many species of birds are found on the site. The most productive habitat is the riparian woodland, which supports a diversity of birds because of its combination of mixed tree layers and well-developed shrub and herb layers. Birds which prefer this habitat include downy woodpecker, western flycatcher, warbling vireo, Wilson's warbler, and song sparrow. Birds associated with the dense chaparral scrub on the north-facing slope include Anna's hummingbird, wren tit, Bewick's wren, fox sparrow, and rufous-sided towee. Birds associated with the open chararral include California quail, Anna's hummingbird, and brown towee. The introduced stands of Monterey pine and cypress provide habitat for birds which prefer coniferous forest habitats. These include band-tailed pigeon, olive-sided flycatcher, Steller's jay, red-breasted nuthatch, brown creeper, and purple finch. Of the birds associated with these habitats, only the wren tit is restricted exclusively to the more dense stands of coastal scrub. Predatory birds such as Cooper's hawk, sharp-shinned hawk, pygmy owl, and great-horned owl will take advantage of the coniferous and riparian woodlands for roosting and as sources of prey.

Most of the mammals expected on the project site are wide-ranging and would include most of the habitats in their movements or, as a group, will use all of the habitats. Small herbivores such as brush rabbit, white-footed mouse, and dusky-footed wood rat are associated with all of the habitat types. Wide-ranging predators such as striped skunk, racoon, and gray fox will cover many habitats in searching for prey. The ornate shrew is the only mammal expected on the site which is restricted to a single habitat, the riparian. The largest species which uses the site is black-tailed deer. During field study, a number of deer tracks were seen along the dirt road, and a two-point buck was seen on the road, near the riparian area.

Amphibians and reptiles expected on the site tend to be less wide-ranging. Expected amphibians include California newt, California slender salamander, western toad, and Pacific tree frog. All of these species require moist habitats and most require water for reproduction. Reptiles expected on the site include western fence lizard, northern alligator lizard, terrestrial garter snake, gopher snake, and ring-necked snake. According to the California Natural Diversity Data Base, the Alameda whipsnake (Alameda striped racer) is found in the general area of the project site. This snake, which is restricted to parts of Alameda and Contra Costa Counties, is listed as rare. Its optimal habitat consists of open, dry brushland with scattered grassy patches and rock outcrops. This snake has been recorded from Leona Heights Park, 2.5 miles to the south, and from the head of Claremont Canyon in Oakland, three miles to the north. However, because of the lack of preferred habitat on the site and the isolation of the site from existing preferred habitat, the probability of occurrence of this species on the project site is low.

Effects of Project Development on Vegetation and Wildlife

The long-term history of site vegetation clearance, and the replacement of the natural creek channel with fill and a drain pipe, is not known. In any case, these activities, along with more recent vegetation removal, have resulted in generally clear areas along both sides of the on-site street right-of-way, between the west end of the site and the east end of the right-of-way. The overall clear area, which does not include Lots 2530, 2531, or 2532 (proposed 2532 A and B) at the east end of the site (see Fig. 5, p. 7), appears to extend far enough up both slopes to generally accommodate proposed development up to the elevations of the proposed retaining walls.

With development as proposed, additional vegetation clearance would include removal of several mature pines at the west end of the site, on the north side of the street, to accommodate development of Lots 2523-2525, and the removal of several mature cypress trees and a substantial amount of additional vegetation, to accommodate development of Lot 2541 and proposed Lots 2532 A and B (Fig. 5).*

The proposed canyon-floor fill would extend up into the creek which enters the site from the northeast, to a point approximately 100 feet beyond the east end of the existing dirt road, and the drain pipe which would be placed in this creek would extend an additional 80-100 feet upstream beyond the fill, to the proposed headwall inlet (Fig. 6, p. 8). Placement of the fill and the access and earthwork which would be required to install the pipe and headwall would result in the elimination of most of the length of the on-site stream channel and the removal of an unknown amount of creekside vegetation. (With installation of the pipe and headwall, it would be necessary to provide an easement along the alignment of the pipe, between the end of the project cul-de-sac and the new headwall, to accommodate maintenance access. There is already a 10-foot-wide sewer easement along part of this alignment, which might also partially accommodate drainage access.)

Future construction of a house on Lot 2531, at the northeast corner of the project site (not controlled by the applicant), would require the removal of an unknown amount of vegetation in the mature cypress grove at the east end of the site.

The extent to which project-site residents would clear and improve the upper elevations of their lots is not known. Access to areas above the proposed walls would be difficult but certainly not impossible. It can be anticipated that some of the residents will want to plant trees above their houses, to provide privacy, even if the upper lot areas are not generally used for outdoor activities.

The removal of vegetation which would be required for project development would substantially reduce overall wildlife-habitat types, particularly in the riparian and cypress-grove areas at the east end of the site and in the coastal scrub area of the south-facing slope. The resulting, simplified habitat structure would reduce the diversity of species and number of individual animals on the site.

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* The City's tree preservation ordinance prohibits the destruction, without a permit, of coast live oaks measuring four inches in diameter 4.5 feet above the ground, or any other trees, except eucalyptus, measuring nine inches in diameter 4.5 feet above the ground.

I. VISUAL CHARACTERISTICS

Architecture

Proposed house designs are shown in plan-view on Figure 6, page 8, and in elevation views on Figure 9, page 13, and Figures 10-14, pages 14-18.

Visibility of the Project Site

Roadway Views. Because of intervening terrain, vegetation, and existing houses, the project site is not visible from most of the surrounding public streets. However, some portions of the site are visible from the following street locations:

A. Chelton Drive/Chatsworth Court/Beaconsfield Place Intersection. Eastbound motorists passing through this intersection, along Chelton Drive, or turning right onto Chatsworth Court, may have a glimpse of the site. This is primarily a limited view of portions of the south slope of the site, above the canyon floor.

B. Beaconsfield Place. The site is, of course, increasingly visible along inbound Beaconsfield Place as one approaches the canyon floor at the west end of the site.

C. Keswick Court. Portions of the north slope, at the west end of the project site, are visible from the Keswick Court approach to Beaconsfield Place, and most of the site's canyon floor, and the vegetation at the east end of the canyon, are briefly visible from vehicles turning left onto Beaconsfield.

Overall, there are no major roadway views of the site, except from Beaconsfield Place and Keswick Court, the only streets from which site access is available.

Views from Surrounding Residential Sites. Much of the area around and overlapping the perimeter of the project site, including some yard-areas of residential lots abutting the site, is characterized by scattered-to-dense stands of mature Monterey pines, cypress, and other vegetation. This nearly-continuous belt of vegetation provides substantial screening of the site from many adjacent, off-site vantage points. It does not, however, preclude views of the site from all surrounding properties, and a number of adjacent residential properties have open or partially-acreened views of major portions of the site. Tree and shrub removal along the upper part of the north slope, just below developed lots fronting Chelton Drive, and within the riparian area at the northeast corner of the site, would increase visibility of the site from Chelton Drive houses. The extent to which such vegetation removal would occur within the areas above the north-slope retaining walls and along the northeast creek channel is not known because it is not indicated on the project plans. Tree removal in the cypress grove at the east end of the site would generally reduce screening of the east end of the site as viewed from a few houses on Longcroft Drive, upslope to the east.

Visibility Photo Study. On the following pages, Figures 29 through 37 provide a photographic study and discussion of project-site visibility. Figures 38 A and B, and 39 A and B provide before-development and after-development sample views of the site from two adjacent, off-site vantage points. The after-development views are intended to generally portray the scale, mass, and locations of proposed units, the project street, and retaining walls, without reference to landscaping or details of improvements or architecture.

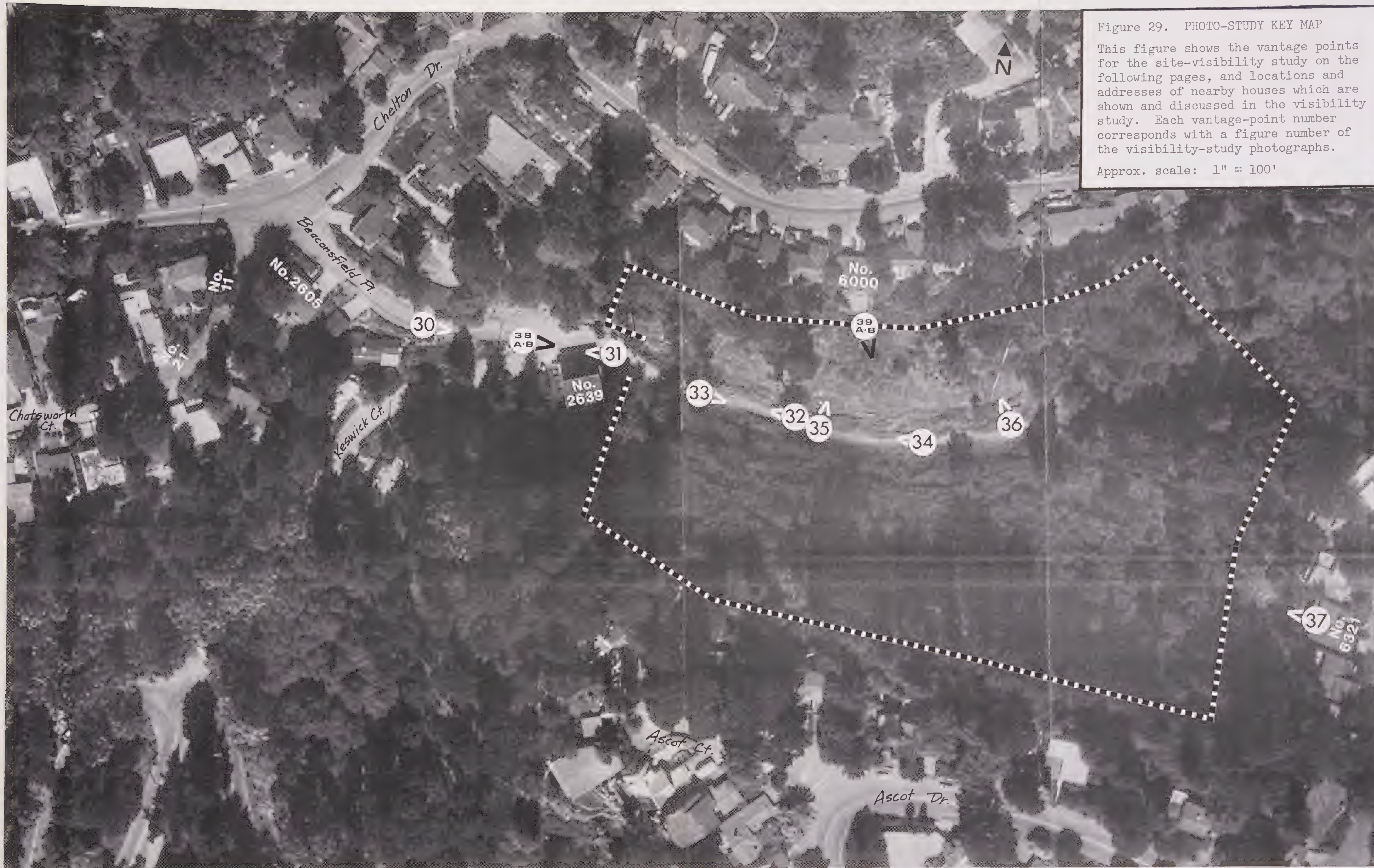


Figure 29. PHOTO-STUDY KEY MAP

This figure shows the vantage points for the site-visibility study on the following pages, and locations and addresses of nearby houses which are shown and discussed in the visibility study. Each vantage-point number corresponds with a figure number of the visibility-study photographs.

Approx. scale: 1" = 100'

Figure 30. View looking southeast down lower Beaconsfield Place, across the Beaconsfield/Keswick Court intersection, toward the entrance to the project site. The house, at 2639 Beaconsfield Place, is closer to the proposed development area of the site than any other surrounding houses and, because of its location at the site entrance, would be more heavily impacted by the project, both during and after construction. Most of the project site is visible from decks and east-facing windows of this house, including most of the north slope and canyon floor, the east end-tree grove, and portions of the south slope. 1: Scattered pines at northwest corner of project site; several of these would be removed (see Fig. 5, p. 7). 2: Cypress grove at east end of site canyon; a number of these trees, and associated vegetation, would be removed to accommodate house construction (Fig. 5). 3: Off-site trees above east side of Longcroft Drive. (From all surrounding vantage points, project development would be viewed against a background of vegetation and existing development.) 4: Trees which provide some screening of the site's south slope, from 2639 Beaconsfield; some trees in this area would be removed. 5: Off-site trees at southeast corner of site (east end of tree screen which extends all along south site boundary). 6: Trees at inside of Keswick/Beaconsfield intersection, which provide some screening of site from north side of Keswick Court.

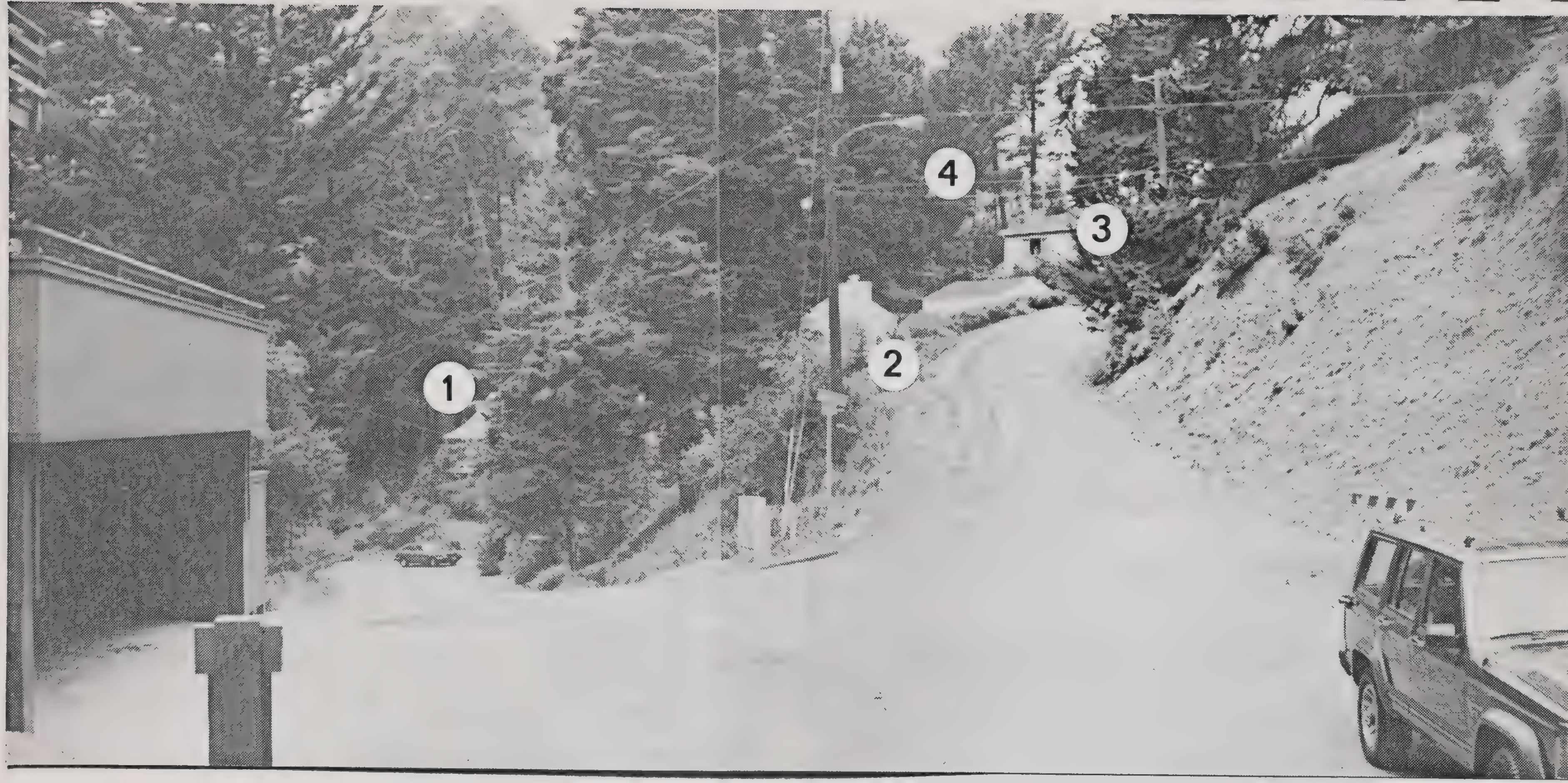


Figure 31. View looking northwest from the project-site entrance toward Keswick Court (left) and Beaconsfield Place (right). The garage of 2639 Beaconsfield Place is at the far left. Dark strips on Beaconsfield Place are a utility-trench patch and, closer to the outside edge of the road, sealed roadway cracks (also apparent in Fig. 30). The roadway cracking indicates possible problems with settlement of fill. Through the curve, Beaconsfield has width of about 18 feet. Widening might be difficult because of the steep upslope embankment. Almost all of the trees in this photograph provide screening of the project site from portions of Keswick and Chatsworth Courts. 1: Portion of front porch of house on north side of end of Keswick Court. A relatively small part of the northwest corner of the site is visible from this part of the house. 2: House on Beaconsfield Place, on lot at inside corner of Beaconsfield/Keswick (garage is just above, to the right, with access from Beaconsfield). This house has east-facing windows with partially-screened view of project site, including portions of north slope and canyon floor, and east-end tree grove. 3: House at 2605 Beaconsfield Place, at inside of Beaconsfield/Chatsworth intersection. This house has windows with views overlooking much of the project site, along the length of the canyon floor. 4: House at #21 Chatsworth Court, which has partially-screened view of portions of the project site.

Figure 32. View looking westward toward the entrance to the project site, from a vantage point approximately 200 feet onto the site, along the canyon-floor dirt road. 1: Lower deck and lower portion of house at 2639 Beaconsfield Place. Vegetation just on-site, east of this house, provides some screening of the site from the house. Some of this vegetation would be removed with construction of a house on the project site's Lot 2552 (Figs. 5 & 6, pp. 7 & 8). 2: Lower roadway slope of Beaconsfield Place. 3: Trees above north side of Beaconsfield Place. These are part of a stand of trees which provide some screening of the project site from houses fronting Chelton Drive in the area just beyond the northwest corner of the site (see Fig. 29). 4: Scattered pine trees at northwest corner of the site (see Fig. 29 and Fig. 5, p. 7). Trees and shrubs in this area are below the proposed northside retaining walls and therefore would be removed during project earthwork. (A number of fallen trees on and around the project site may indicate that the site's pine trees are in poor enough condition that preservation of such trees in the immediate area of development could be hazardous to site improvements.)

Figure 33. View looking eastward along project site, from a canyon-floor vantage point approximately 100 feet onto the site. 1: Pine tree which is part of scattered grove at northwest corner of site. 2: Cypress grove at east end of site (contrasting edge of riparian growth can be seen to left of cypress grove; see Fig. 28). 3: Off-site tree groves above east side of Longcroft Drive. 4: House at 6321 Longcroft Drive. This house has decks and rear windows from which most of the site's area is visible, including the south slope, most of the canyon floor, and the west end of the north slope (see Fig. 37). 5: Upper edge of trees around southeast corner of site--the east end of the stand of trees which extends all along the site's south boundary. 6: Upper edge of cleared area on site's south slope.

Vegetation at far right is adjacent to house at 2639 Beaconsfield Place. Some or all of the vegetation in this area would be removed to accommodate roadway construction and a house on Lot 2552 (Fig. 5, p. 7). The two houses next door to 6321 Longcroft Drive have partially-screened views of the project site. Other houses in this area, to the north and south along Longcroft Drive, are well screened.

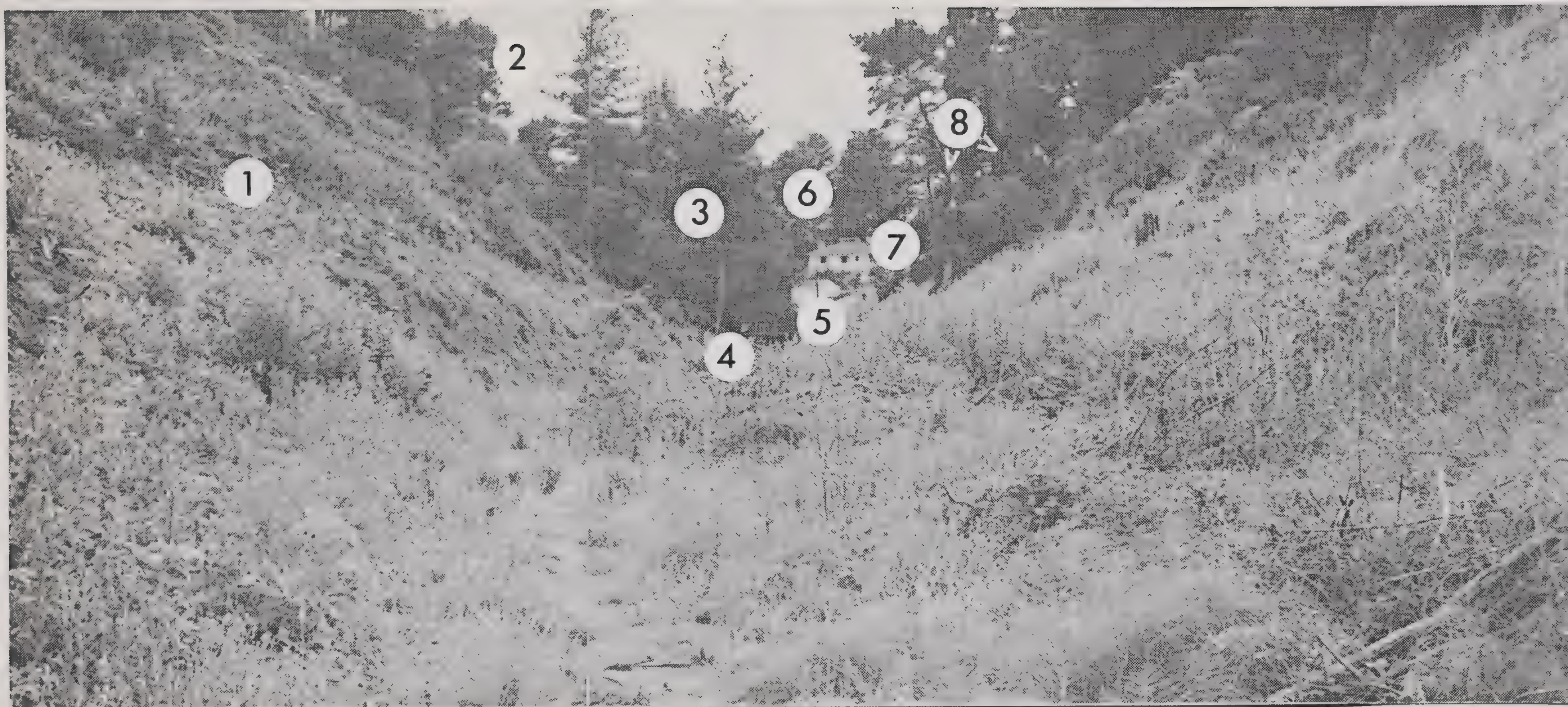


Figure 34. View looking westward toward the entrance to the project site, from a vantage point approximately 300 feet onto the site, along the canyon-floor dirt road. 1: Upper edge of cleared area on south slope. 2: Off-site trees beyond southwest corner of project site--part of the stand of trees which stretches from the area south of Keswick Court, along the ridge at the site's south boundary, to the southeast corner of the site, near Longcroft Drive (Fig. 29). 3: Trees just east of house at 2639 Beaconsfield Place (#4 in Fig. 30). 4: Lower deck and portion of house at 2639 Beaconsfield Place. 5: Garage of house at inside corner of Beaconsfield/Keswick intersection (house not visible from this vantage point; see Fig. 31). 6: Portions of houses at #11 and #21 Chatsworth Court, which have some partially-screened window views of the site, looking along part of the canyon floor to the east-end cypress grove. 7: House at 2605 Beaconsfield Place (#3 in Fig. 31). 8: Scattered pines at northwest corner of project site.

Figure 35. View looking north toward houses on Chelton Drive, above north boundary of project site, from a vantage point approximately 220 feet onto the site's canyon floor. The house at the center of the picture is at 6000 Chelton Drive. The rear windows and deck of this house have open views of a large portion of the project site, looking across the largely-unscreened scrub area on the central part of the site's north slope. Portions of several other houses, to the east and west of 6000 Chelton Drive, can be seen through the trees and brush. The houses to the west (left) have partially-screened views of the site (see tree stand in this area, Fig. 29); the houses to the east (right) have views ranging from open to partially-screened (see Fig. 36). The foreground area below 6000 Chelton Drive is project-site Lot 2526 (Fig. 5. p. 7), one of the three lots not controlled by the applicant. The proposed retaining walls would not extend into this portion of the site's north slope. The closest proposed house in this area of the site (on Lot 2527) would be about 70 feet downslope from the rear property line of 6000 Chelton Drive.

Figure 36. View looking northwest toward houses on Chelton Drive, above north boundary of project site, from a vantage point at the east end of the project-site dirt road (the turnaround area of the proposed street). The bare tree at the far left (arrow) is the tree which in Figure 35 is directly in front of the deck of the house at 6000 Chelton Drive. The fallen tree in the foreground can also be seen in Figure 29, just north of the east end of the site's dirt road. In this view, portions of several houses can be seen through the trees and shrubs. The white house in the center of the photo has open views of much of the project site; the other houses have partially-screened views. Vegetation at the far right foreground is the edge of the riparian-vegetation area at the northeast corner of the site (Fig. 28). Chelton Drive houses out of the photo to the right, above the riparian area, are well screened from views of the site. (About 100 feet of the lower reach of the riparian would be filled, and a pipe and headwall would be installed above the fill.)

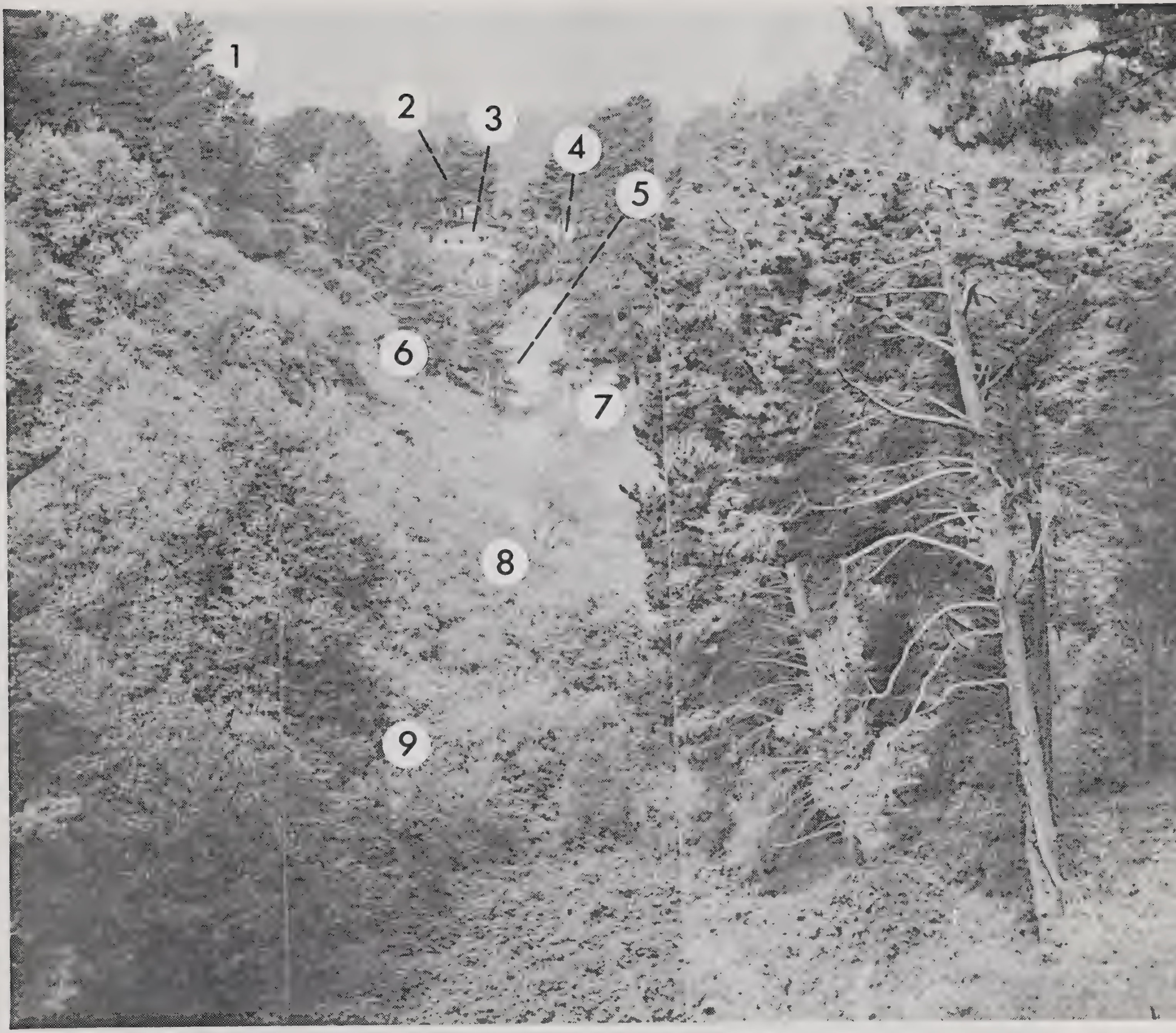


Figure 37. View looking west at the project site, from upper deck of house at 6321 Longcroft Drive (#4 in Fig. 33). 1: West portion of tree grove which extends along top of ridge at the site's south boundary. 2: Portion of house at #11 Chatsworth Court (#6 in Fig. 34). 3: House at 2605 Beaconsfield Place (#3 in Fig. 31; #7 in Fig. 34). 4: Chelton/Chatsworth/Beaconsfield intersection. 5: Lower slope of Beaconsfield Place. 6: Trees just east of house at 2639 Beaconsfield Place (house not visible from this view). 7: Scattered pine trees at northwest corner of site. 8: Elderberry "tree" shown on project site plan, at east property line of Lot 2544 (Fig. 5, p. 7). 9: Drainage swale entering southeast corner of site. The house proposed to be built in this swale (proposed Lot 2532-A, Fig. 5) would be about 60 feet downslope from the rear property line of 6321 Longcroft Drive. The tree grove at the right-hand side of this picture is a portion of the dense cypress grove at the east end of the project-site caynon.

Figure 38-A. BEFORE-DEVELOPMENT VIEW FROM PROJECT ENTRANCE

View looking eastward along project-site canyon with house at 2639 Beaconsfield Place at right. Vantage point is about 100 feet east of most easterly project boundary, at outside edge of Beaconsfield Place, near inside of Beaconsfield/ Keswick Court intersection, above lower, paved terminus of Beaconsfield (compare with Fig. 31).

Figure 38-B. AFTER-DEVELOPMENT VIEW FROM PROJECT ENTRANCE

Same view as in Figure 38-A, showing approximate locations of proposed houses and project street. Unit on far left is on Lot 2523 (Fig. 6, p. 8), with units on Lots 2524, 2525, and 2527 behind. Facing unit above end of road is most easterly unit at end of cul-de-sac. Unit seen through deck railing of existing house is next door on Lot 2552, with several units beyond, at east end of developed area on south side of street. Precise effects of roadway grading adjacent to existing house are not known but need to be considered before final project plan is approved.

Figure 39-A. BEFORE-DEVELOPMENT VIEW FROM NORTH RIDGE

Vantage point is rear deck of house at 6000 Chelton Drive (Fig. 29), looking south across the project site. A: 12-inch elderberry on east property line of Lot 2544. B: Unused utility pole at mid-slope between Lots 2542 and 2544. C: 28-inch oak at mid-slope on Lot 2546. (A, B, and C can be seen on Figure 5, page 7; the pole and oak tree can be seen in Figure 38-B, right.) Dark area across top of picture is portion of pine/cypress stand along top of south ridge, in and around yards of houses on north frontage of Ascot Court/Ascot Drive.

Figure 39-B. AFTER-DEVELOPMENT VIEW FROM NORTH RIDGE

View is same as figure at left, showing approximate locations of proposed houses, project street, and retaining walls on south slope. Units on far side of street are, left to right, on Lots 2542, 2544, 2545, and 2546, with back corner of house on Lot 2549 at far right (Fig. 6, p. 8). Units on near side of street are on Lot 2528, left, and 2527, center, the latter lot being directly below 6000 Chelton Drive. Lots shown on near side of street do not have upslope retaining walls as shown on far slope.

IV.
ENVIRONMENTAL IMPACT ANALYSIS

A. SERVICES AND UTILITIES

1. Beaconsfield Place Sewer Line

Impact. With the project's proposed roadway fill, the flow-line of the existing sewer in the Beaconsfield Place right-of-way would, in some locations, be about 20 feet below the surface of the new roadway. According to the City's Office of Public Works, such depth would not be acceptable due to potential maintenance problems.

Mitigation. The sewer line should be reconstructed to a maximum depth of six feet below the finished roadway grade, unless specifically approved otherwise. (See item #1, OPW memorandum of Nov. 2, 1988, in Appendix B.)

2. Firefighting Water Pressure

Impact. The Fire Department's fire-hydrant flow requirements for Oakland's hill areas are 1,500 gallons/minute, for two hours, with 20 pounds of residual pressure. The Fire Prevention Bureau has indicated that water pressure in the project area may not be sufficient to meet the required pressure standard.

Mitigation. Before the project is approved, the applicant should provide the Fire Prevention Bureau with one of the following:

a. Pressure-test results indicating that project firefighting-water-supply pressure will be sufficient to meet Fire Department standards.

b. An alternative firefighting water-system design which will provide the required flow and pressure.

3. Project Fire Hazards

Impact. The project site is in a critical-fire-hazard area where additional development could increase the fire-hazard potential.

Mitigation.

a. Provide fire hydrants in accordance with requirements of the Fire Marshall, including one hydrant within 100 feet of the end of the project street.

b. Provide fire-retardant roof covering.

c. Install fire sprinklers in each house in accordance with Fire Marshall's standards, and provide "hard wired" smoke detectors.

(See detailed Fire Department recommendations in memorandum of Mar. 9, 1988, in Appendix C.)

B. TRAFFIC, CIRCULATION, AND PARKING

1. Existing Beaconsfield Place

Impact. The existing paved stretch of Beaconsfield Place, between Chelton Drive and the west project-site boundary, has pavement width as narrow as 18 feet, has very-poor pavement quality along its lower area, approaching the project site, and appears to have failing pavement along the outside edge of the roadway between Chelton and Keswick Court.

Mitigation.

a. The lower, flat area of Beaconsfield Place, between Keswick Court and the west site boundary, should be repaved, in accordance with City standards, when the project street is constructed.

b. The Public Works staff should determine the extent to which Beaconsfield Place between Chelton Drive and Keswick Court should be improved in conjunction with project development. Pavement widening would be appropriate in order to better accommodate project traffic and emergency-vehicle access, and to provide shoulder area to decrease hazards to pedestrians. (The extent of roadway widening could be restricted by problems associated with additional cutting of the existing cut-slope embankment above the inside of the roadway curve, as shown in Figure 31, page 62, and by the need to maintain access to the existing residential parcels above the cut-slope area.) The Public Works staff should also consider the possible need for reconstruction of the outside edge of the roadway, where pavement cracking may be an indication of roadway settling.

2. Keswick Court Sight Distance

Impact. At the Keswick Court approach to Beaconsfield Place, sight distance up Beaconsfield is limited by the sharp configuration of the intersection and the elevation of Beaconsfield above Keswick. With these conditions, the addition of project traffic will increase the potential for vehicle conflicts at the intersection.

Mitigation. Install a stop sign and painted stop-bar at the Keswick Court approach to the intersection.

3. Keswick "Driveway"

Impact. The driveway connecting the west end of Keswick Court and Chelton Drive is very narrow and has poor sight-distance at Chelton Drive. Use of this roadway by project traffic could result in unnecessary congestion and traffic hazards. (This route is not needed for regular access to Keswick Court and Beaconsfield Place.)

Mitigation. Preclude or limit through traffic by one of the following methods:

a. One-Way Travel. Beyond the units with access to the west end of the driveway, limit use of the roadway to one-way-only, eastbound. This would require posting of signs on Keswick Court: "One Way Only - Do Not Enter" at the end of the court, approaching the driveway, and "Not a Through

Street" at the entrance to the court. Assuming that drivers would obey the signs, this mitigation would preclude outbound (westbound) use of the roadway but would allow inbound (eastbound) use, thus limiting through traffic to inbound turning movements at Chelton Drive.

b. Emergency-Use Only. Install removable barriers (possibly posts with locked chains) at the west end of Keswick Court, at the driveway entrance, and east of the units with access to the west end of the driveway, to preclude regular through traffic but allow emergency-vehicle access; and post signs at the entrance to Keswick Court and on Chelton Drive, indicating lack of through access.

(Because the Keswick driveway is a public right-of-way, either of these mitigation measures would require City Council approval. Barriers would have to be consistent with Fire Department standards.)

4. Project Parking

Impact. Because about one-half of the proposed units have driveways too short to accommodate parking of the largest passenger vehicles without overhanging the proposed street, and because of the tendency of single-family residents to use garages for storage rather than for parking, it is anticipated that project residents would regularly park on both sides of the proposed 30-foot street, thereby reducing travelway width to less than 20 feet and creating the potential for obstruction of firefighting vehicles.

Mitigation. Consider one of the following alternatives:

a. Redesign the plan so that all units have minimum 20-foot-long driveways, and provide deed restrictions which disallow the parking of recreational vehicles and disabled vehicles in driveways. (This might generally assure the availability of a minimum of two off-street parking spaces/unit, but would not necessarily preclude congestion from on-street parking. Also, depending on unit designs, this mitigation could require additional earthwork because of increased unit setbacks from the street.)

b. Redesign the plan so that all units have minimum 18-foot-long driveways, install roll-up-type garage doors (which allow closer parking than overhead hinged doors), and provide deed restrictions disallowing recreational- and disabled-vehicle parking in driveways. (This would probably have about the same advantages and disadvantages as Mitigation "a", above. Based on current patterns of compact and standard auto ownership, 18-foot driveways could be expected to accommodate between 60 and 80 percent of project passenger vehicles.)

c. Redesign the plan, as shown on Figure 40, to locate pairs of individual garages along common property lines; construct the project street with 24-foot width (two 12-foot travel lanes); and, on both sides of the street, build eight-foot-deep parallel parking bays between pairs of driveways, outside of the 24-foot street. This design would combine the benefits of a 40-foot-wide street (24-foot travelway plus two 8-foot parking bays), for purposes of on-street parking, with the benefits of a 24-foot-wide street for the purpose of keeping units fairly close to the street in order to limit earthwork. However, the additional paved width between driveways would reduce landscaping area in front of the houses.

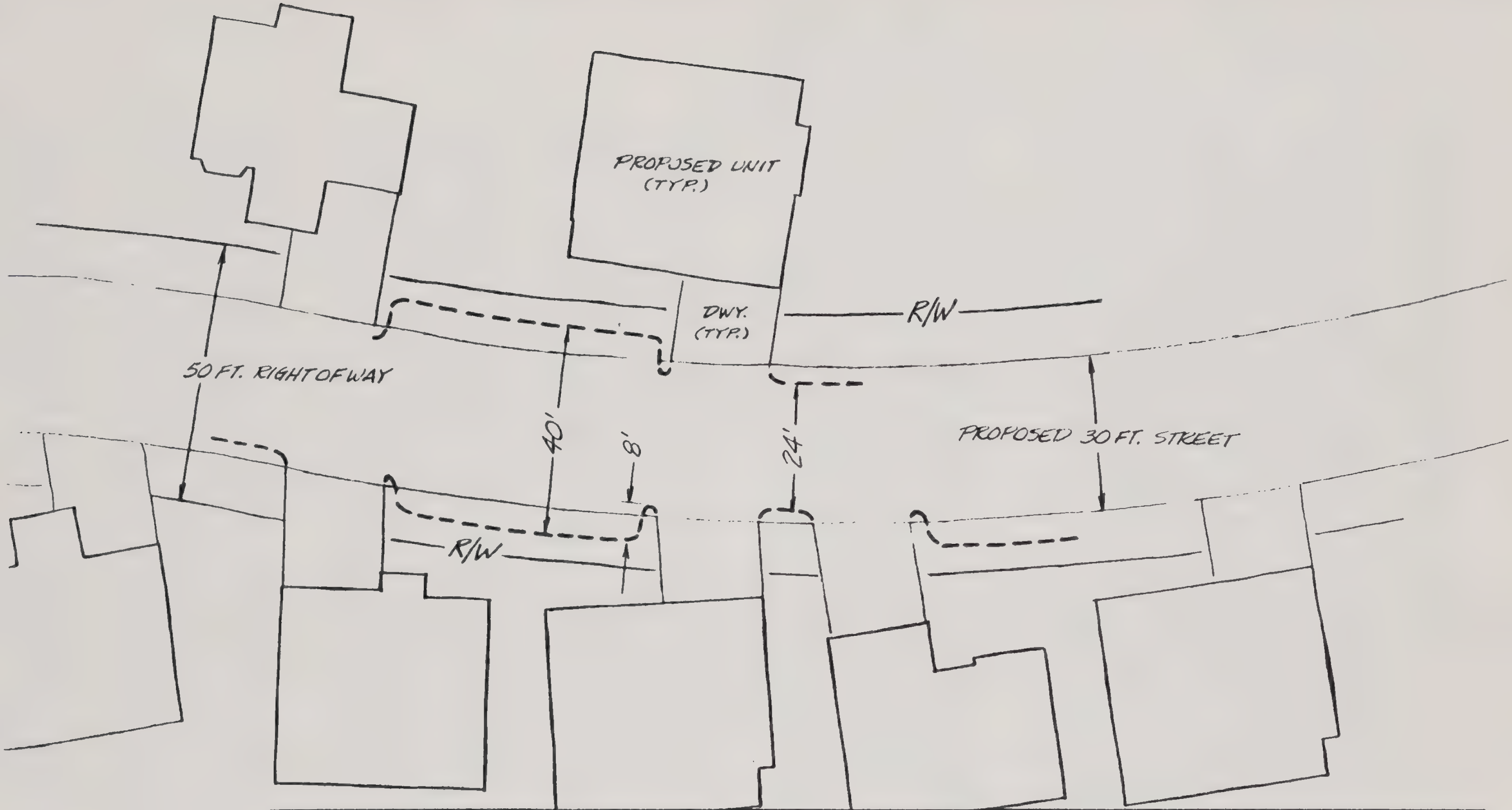


Figure 40. PARALLEL BAYS FOR ON-STREET PARKING

The dashed lines show how the project street might be redesigned to accommodate parking bays. Proposed street width is 30 feet. With 8-foot-deep parking bays, the width could be reduced to 24 feet, which would provide two adequate 12-foot travel lanes. This would allow the shorter proposed driveways to be lengthened, to assure adequate parking area for two vehicles, without compromising travelway width. This design would provide the equivalent of a 40-foot street, without the need for the additional grading that would be result from pushing the units farther back into the slopes in order to provide longer driveways. The parking bays would somewhat reduce roadside landscaped areas. Parking-bay lengths could be maximized if pairs of driveways were located along every other common side-yard property line.

5. Construction-Vehicle Traffic and Parking

Impact. The volume and sizes of construction vehicles which will be required for project development have the potential to cause significant traffic congestion and safety hazards along the roadway route and entrance to the site. The Ascot-Chelton Drive route has areas of poor sight distance, sharp curves, and grades of 10% or greater. These characteristics will result in slow truck travel and the probable use of both travel lanes in some areas. Construction vehicles will have to pass the entrances to Joaquin Miller and Montera Schools, where limited sight distance is a particular problem. At the entrance to the site, access and street area are limited, and it is anticipated that unless construction vehicles are otherwise accommodated, there will be great temptation to make excessive use of the Beaconsfield/Keswick intersection for parking, queuing, and vehicle storage, and for storage of materials. It also seems likely that the wide pavement and moderate roadway grade of Chelton Drive at the Beaconsfield/Chatsworth intersection will be tempting for such purposes.

Mitigation. The applicant should submit a construction-traffic plan, for City approval, indicating how construction traffic would be managed to mimimize project-area traffic congestion and safety hazards. When accepted by the City, this plan should be a condition of approval of the project, with procedures subject to field inspection and enforcement. Although construction-traffic management will be most important during the project's first-phase period of heavy construction, the various phases of house construction should also be accommodated in the traffic-management plan, perhaps tied to issuance of building permits. The traffic-management plan should address, but not necessarily be limited to, the following:

a. Timing. Ideally, construction transportation would occur during summer months, to avoid impacts at the Joaquin Miller and Montera Schools entrances. If construction traffic occurs during school terms, heavy-vehicle movements should be timed to minimize travel during hours of peak commuter traffic, darkness, and beginning and end of daily school sessions. Within practical limits, heavy-vehicle traffic should be consolidated, to avoid long periods of continuous traffic disruption.

b. Control. During periods of heavy-vehicle movement, sufficient flagmen, in radio contact, should be provided along the access route to the site to assure adequate vehicle control at all locations where traffic conflicts could be a problem. Particular attention to traffic control should be provided in the area of the school driveways and Mountaingate Way, at the Ascot/Chelton intersection, at the Chelton/Chatsworth/Beaconsfield intersection, and at the Beaconsfield/Keswick intersection.

   During some on-site construction procedures, and during construction involving Beaconsfield Place, flagmen-controlled use of the Keswick driveway may be appropriate for residents of Keswick Court and Beaconsfield Place, although this alternative should not regularly be used as a substitute for controlled access along Beaconsfield. Except for limited light-vehicle use that might be required during construction activities on Beaconsfield Place, construction traffic should be prohibited on Keswick Court and driveway.

c. Traffic at the Project Site. Construction traffic should be controlled to minimize disruption of the Keswick/Beaconsfield intersection, at the entrance to the project site. With development as proposed, some earthwork and construction must occur in this area. However, it may be possible to

limit disruption of this area by making rough grading of the project street and turnaround area one of the first development procedures. This could make it possible for vehicles to turn around on-site, accommodate vehicle parking for overnight storage and offloading of materials, and somewhat limit the need for construction vehicles to manuever within the off-site portion of Beaconsfield Place.

d. Supervision and Notification. One person, either an independent contractor or a member of the applicant's development team, as approved by the City, should have the responsibility for management of construction traffic. The manager's duties should include supervision of traffic control; notification, as needed, of the City, the Police Department, AC Transit, the Oakland Public Schools, and project area residents, regarding construction-traffic movements; and regular inspection of project-site access routes, to make sure they are kept free of construction debris, rock, sand, etc.

6. Construction-Traffic Damage to Roadways

Impact. Heavy construction-vehicles required for project development could cause damage to existing roadway improvements along the access route to the project site.

Mitigation. Before a grading permit is issued, the City should prepare or require a study of the condition of roadway improvements along the access route to the site. The study information should be sufficient to allow post-construction comparison of roadway conditions with existing conditions, to allow determination of whether the applicant should be required to make repairs to damage caused by construction vehicles. A bond or other assurance, consistent with normal City requirements, should be provided to assure availability of funding for repairs.

C. GEOLOGY, SOILS, AND GRADING

1. Grading Plan

Impact. The applicant has not submitted a standard grading plan of the type which is normally required for new subdivisions. Instead, a number of separate plan sheets, including sample cross sections, plan views, and a plan/profile set, show the general grading concept in terms of retaining wall locations and roadway fill. No information is presented for sideyards or for lots which would not require retaining walls, and there are no details regarding earthwork around the roadway entrance to the site and the effect it would have on the existing house at 2639 Beaconsfield Place, located on the south side of the street, adjacent to the west boundary of the project site.

Mitigation. Although the project is not a new subdivision, its development will be equivalent to that of a new subdivision. The grading plan should be consistent with all subdivision grading-plan requirements of the City of Oakland, and should be reviewed by the applicant's geotechnical engineer, to provide assurance that proposed earthwork is consistent with the recommendations of the applicant's Alan Kropp & Associates 1988 and 1989 geotechnical reports. Grading for Lots 2526 through 2532-B should avoid cut slopes at the rear of the lots unless specifically approved by the geotechnical consultant. The grading plan should include details of earthwork in areas abutting the existing developed lot at 2639 Beaconsfield Place, to assure that this lot will not be disrupted during project grading. If project earthwork would involve this off-site lot, it is the responibility of the applicant to obtain rights of construction entry from the lot owner and to arrange for repairs and clean-up as required.

2. Earthwork and Retaining Walls

Impact. To generate fill material, excavation is proposed along the lower areas of steep slopes which show evidence of active mass wasting (erosion, soil slippage, and sloughing). This poses the potential for reducing the stability of a broad, upslope area. The proposed solution is to construct tiered wood walls, up to six feet in height, at the rear of cut areas. (The applicant has also indicated interest in construction of Earthstone walls if there is objection to wood walls. Earthstone is a wall system involving a concrete facing element that has been successfully used to control surface raveling in areas of generally competent rock, where near vertical slopes are required. Sample commercial literature regarding the Earthstone system is contained in Appendix F.)

The potential problem with a wood wall is its longevity. Eventually, wood will rot and need to be replaced. Moreover, if the wood is allowed to be damp, especially if pressure-treated wood is nicked or gouged, or if interior wood is exposed by cutting boards to new lengths, the rate of decomposition would be unacceptable. It should also be recognized that the project's limited sideyard areas and steep sideyard slopes would make wall repair or replacement difficult, especially after long-term establishment of landscaping and improvements such as small, individual walls, stairways, etc.

The slope behind the proposed walls is steep (50% or greater) and up to 50 feet high, typically. The Alan Kropp & Associates borehole data indicate that the material to be retained consists of soil and rock that is severely weathered and fractured. Also, property owners may wish to establish ornamental plants in the areas of the walls, and regular irrigation of such landscaping could have an adverse effect on the life of the wood.

Mitigation. Permanent walls (concrete) are preferable to wood walls. Field conditions are such that Earthstone is not an appropriate alternative.

It is recommended that wood posts be avoided, whatever the design of the wall. Instead, concrete columns that are imbedded well into competent rock and heavily reinforced with rebar are suggested. The spacing of posts, depth of concrete piers, and diameter and number of steel rebars should take into account the adverse geologic conditions. The design should also carefully take into account the type and lengths of lagging. Concrete lagging is preferable to wood boards. However, if pressure-treated wood is used, and if the lagging comes in eight-foot lengths, the spacing of columns should be four feet, not five feet, so that lagging boards are butted behind posts and there will be no need to expose interior wood by cutting boards to new lengths. If wood is used as lagging, imported drain rock will be required.

Even minor errors in the design and construction of the walls could result in long-term stability or maintenance problems. One such omission could be sufficient to reduce the long-term safety of the walls and slope area above. It is crucial that the grading code be carefully implemented, that the wall not be under-designed, and that all grading procedures be accurately documented to ensure the highest quality of performance. The geotechnical and structural engineers' calculations for the wall should be critically reviewed by the City.

The grading permit should specify that the applicant will submit a grading-completion report that will contain a detailed, as-graded plan, signed by the geotechnical engineer and engineering geologist. This plan should show stratigraphic units, aquifers, and bedding and joint planes. It should also include all subdrains and their connections, surveyed and mapped by the civil engineer.

The City should also consider retaining a geotechnical engineer and/or engineering geologist to monitor excavation and filling operations, to review any design modifications proposed during grading, and to review as-built plans and reports. (Several jurisdictions currently require monitoring of this type for projects in sensitive areas.)

3. Surface Drainage and Irrigation

Impact. Landscape irrigation could significantly raise groundwater levels at the project site. Irrigation could subject slopes to the equivalent of the wetter climatic conditions of the past, contributing to destabilization of cut slopes. Landscape irrigation in the project residential areas could cause either shallow or deep-seated slope movement. (The applicant's Alan Kropp & Associates 1988 report's borehole logs indicate subsurface moisture only in the area of the drain pipe along the site's canyon floor, which may be the result of leaks in the pipe. During field investigation, some ponding of water was noted at the lower reach of the drainage channel which enters the site from the northeast. This may be due to landscape-irrigation runoff accumulating in a poorly-drained area of the channel.)

Mitigation.

a. Alan Kropp & Associates has recommended lined drainage ditches at the upper property lines of the lots, behind the upper retaining walls, and at the rear foundation/retaining wall of each house, and has also recommended mid-slope drainage terraces on all slopes with 25 feet or greater height. Closed conduits have been recommended to convey runoff from roof gutters and graded slopes to adequate storm-drain facilities.

b. All graded slopes should have either brow ditches or berms along their crests, to control surface runoff. These drainage structures should be underlain by subdrains.

c. Landscaping of lots should emphasize native, drought-tolerant species, to limit the need for irrigation. The project landscape architect should work with the Water Conservation Office of EBMUD to develop plans for installation and maintenance of water-conserving species.

d. All slopes and drainage ditches should be maintained by the property owners in accordance with a scheduled-maintenance plan prepared by a registered civil engineer and approved by the City. This plan should be provided to the property owners along with the documents they would routinely receive at the time of purchase. (Alternatively, if a home-owner association is formed, the scheduled maintenance plan could be made part of the association's required maintenance obligations.)

D. DRAINAGE

1. Secondary Drainage System

Impact. The project submittal does not include complete plans for a secondary drainage system which will be needed to assure that runoff from residential lots is adequately collected and conveyed to the proposed roadway storm-drain system.

Mitigation. Provide a complete drainage-system plan consistent with the recommendations of the applicant's geotechnical study by Alan Kropp & Associates and in conformance with the subdivision ordinance and other regulations of the City of Oakland. Runoff collected from the rear yards of lots and from roof gutters should be conveyed in a closed system to the proposed roadway storm drain, or, if necessary, to an auxiliary roadway storm drain, rather than being directed to street gutters. (Recommendations from the Alan Kropp & Associates study are contained in Appendix F.)

2. Maintenance of Private, Common Drainage Facilities

Impact. Because of the combination of steep project-site slopes and the proposed provision of common, privately-owned drainage facilities, the City must be assured that project residents will act collectively to provide long-term drainage-system maintenance and repairs in order to preclude runoff-related geologic and property-damage problems.

Mitigation. In conjunction with submittal of final project plans, the applicant should propose a system for assuring long-term maintenance of common drainage facilities associated with the proposed retaining walls, and any other common facilities, to be permanently binding on project property owners.

3. Trash Rack at Proposed Storm Drain Headwall

Impact. The proposed storm-drain headwall at the northeast corner of the project site (Fig. 6, p. 8) could become obstructed by debris washed down the creek channel, possibly resulting in overflow and damage to downstream improvements.

Mitigation. Final drainage-system plans should include a trash rack (debris catcher) designed in accordance with City requirements.

E. VEGETATION/WILDLIFE and VISUAL CHARACTERISTICS

(The project site consists of existing legal lots-of-record served by an unimproved public right-of-way. Although proposed development would be physically equivalent to a new major subdivision, the EIR must address the project within the context of its current legal configuration. To do otherwise would involve matters of City policy--matters which are beyond the purview of an EIR. Therefore, identification of impacts and presentation of mitigation measures, with regard to vegetation and wildlife, and visual characteristics, are limited to consideration of unavoidable effects of development of the site in its current legal configuration, with a house on each existing lot.

(Because vegetation and wildlife characteristics and visual characteristics are closely interrelated, these two aspects of the site and the proposed development are combined in the impact/mitigation discussion below.)

Impact. The project would result in major changes in the biological and visual nature of the site. Earthwork, street improvement, and house construction would eliminate about one-half of the site's existing vegetation community, which would alter the habitat structure of the site and reduce its wildlife value.

Although the site is generally well screened by terrain and vegetation from most of the surrounding neighborhood, a number of nearby properties have views of major portions of the site, which range from partially-screened to generally-unobstructed. The effects of existing vegetative screening will be reduced in all areas where tree and large-shrub removal occurs, thereby increasing, to varying degrees, the extent to which the developed site is visible from surrounding vantage points. From vantage points where neighbors have generally unobstructed views of major portions of the site, project development will result in major, long-term changes in visual character. From vantage points which are partially screened, the stark contrast of new development will reduce long-term visual quality, until such time as project landscaping matures. From some vantage points (above the east end of the site, and off-site to the west), even mature project-site landscaping probably would not completely screen the project street and houses.

Mitigation.

a. For houses, provide natural-appearing finish materials and earth-tone colors, to limit strong visual contrasts.

b. Avoid subdivision of the two lots at the southeast corner of the site into three lots, to limit vegetation removal and habitat disturbance at the east end of the site. (This option is discussed in more detail in the EIR section addressed to project alternatives.)

c. Provide a detailed landscaping plan addressed to methods of minimizing project-site vegetation removal, maintaining functional areas of wildlife habitat, and providing planting to optimize long- and intermediate-term visual screening, within the constraints of overall site development. Such a plan should be coordinated by a landscape architect but should include recommendations from a qualified vegetation specialist with knowledge of characteristic species of the Oakland Hills biological setting. The plan should include a reasonable combination of street, front-yard, side-yard, and upper-elevation trees and shrubs which will ultimately provide both direct screening of the most prominent views of the site, and general visual relief in the immediate development area (visual "softening" of structural forms). Species should be selected to balance the need for drought tolerance, desire for rapid growth, screening effectiveness, need for erosion control, and requirements for firefighting access and prevention of the spread of wildfire. To the extent practical, plant species should be native or otherwise compatible with the vegetative setting of the project-site area. Substantial design effort should be made to avoid the typical pattern of suburban-tract landscaping which is characterized by symmetry and uniformity of a limited range of species.

d. The project landscaping plan should include an irrigation plan which will assure the maintenance of plant growth, and should address the protection of any important trees which are to be preserved but are located where they might be damaged during construction or compromised by improvements.

e. The approved landscaping should be bonded or otherwise assured, as other kinds of development improvements are assured, and installation should be inspected by the City or by an inspector approved by the City.

f. The Planning Commission should consider the propriety of Planning Commission review and approval of the required landscape plan, in public hearing.

Constraints on Project Landscaping

It is not expected that landscaping would completely screen project development or that a substantial level of vegetative screening would be achieved within a short period. However, it should be possible to accelerate development of the overall site landscaping which would ultimately be provided by project residents--who are also expected to desire screening--by thinking of it as an integral part of the project rather than as subdivision window dressing.

Preparation of an appropriate plan for installation and maintenance of project-site landscaping may require a great deal of imagination. Effective landscaping will probably require an approach which will balance the need for planting of various areas by the developer with the need for leaving portions of private yard areas to be planted at the discretion of individual lot owners. With such an approach, it would be expected that the developer would concentrate on upper-elevation peripheral areas, the entrance to the site, and portions of front-yard areas. Along the periphery of the site, some of the difficulty of assuring long-term landscaping maintenance might be overcome by cooperating with adjacent neighbors and providing planting along their rear property lines, which the neighbors would then maintain.

V.
ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

A. NON-SIGNIFICANT ADVERSE IMPACTS

1. Cumulative increase in peak runoff and siltation, and cumulative decrease in downstream water quality.

2. Cumulative decrease in vegetation types and wildlife populations.

3. Cumulative increase in traffic volume.

4. Long-term, cumulative increase in air pollution; and short-term, periodic construction air-pollution (dust, fumes).

5. Cumulative increase in energy consumption.

6. Cumulative increase in demand for services and community facilities.

7. Long-term, cumulative increase in project-area ambient noise level; and short-term, periodic construction noise.

B. SIGNIFICANT IMPACTS

Although a number of the project's potential impacts could be avoided or mitigated through the various measures suggested in this report, change in the character of the site, as an element of the immediately-surrounding neighborhood, could not be avoided with development as proposed.

The proposed earthwork and improvements would greatly alter the appearance and character of the site as perceived by the immediate neighbors. However, because development would be concentrated in a canyon which is not generally visible beyond the immediate site boundaries, visual impacts would not effect a broad area of the project-site neighborhood.

Initially, the site would undergo development changes which would extend over several years of phasing. Earthwork, including grading required to develop the three lots which are not controlled by the applicant, would involve about one-half of the approximately 4.8 gross acres of the site (including street right-of-way). Much of the site's vegetation would be removed, including a number of scattered trees and a substantial portion of the prominent tree grove at the east end of the site.

Upon completion of construction, the street, retaining walls, and multi-story houses would form a series of linear elements which would visually dominate views of the site from all surrounding vantage points. Exposed areas not occupied by pavement and houses would begin to be filled-in by landscaping and regeneration of native plant species. Eventually, it could be expected, as is common to all new residential development, that the maturation of trees and shrubs would provide visual relief and screening which would help soften the prominent visual features of the development. This would be a long process, however, possibly up to 10 or 15 years, during which the project, because of

its overall pattern of similar houses arranged in rows along the street, would present more of the appearance of a suburban subdivision than the appearance of varied residential development which characterizes the surrounding neighborhood.

Because of its canyon terrain, and lot and street right-of-way arrangement, and the need to provide adequate access and building sites, it is probable that any plan for full development of existing legal lots would result in a project which would be perceived by nearby residents as inconsistent with neighborhood character.

VI. GROWTH-INDUCING IMPACTS

Development of the proposed project would constitute what is sometimes known as "infilling"--the development of a remnant area which was bypassed in the course of development of the larger, surrounding area. Because of this, development of the project site would require no utility or roadway extensions which would open new areas to development. Therefore, the project would have no direct growth-inducing impact (other than accommodating future development of the three project-site lots which are not controlled by the applicant).

VII. ALTERNATIVES TO THE PROPOSED PROJECT

A. NO PROJECT

The project site could be retained in its undeveloped state. Under this alternative, development impacts would be deferred for an undetermined period.

B. DEVELOPMENT LIMITED TO EXISTING LOTS

By precluding the proposed subdivision of two lots into three lots, at the southeast corner of the site, development could be limited to construction of 16 houses on existing lots, with three existing lots left for future development (ultimate, total development of 19 lots rather than 20 lots). This alternative would not greatly reduce the overall effects of project development. However, it could have a net positive result, by providing flexibility in the siting of a house on the existing large lot at this corner of the site. By limiting the development of this area to one house, rather than two, it should be possible to locate the house fairly close to the end of the project cul-de-sac, thereby limiting required earthwork and vegetation removal, and reducing visual impact for neighbors upslope to the east. Retention of the existing large lot at the southeast corner of the site, and location of a house near the end of the cul-de-sac, would also result in a somewhat larger wildlife-habitat area along the east end of the site.

C. DEVELOPMENT WITHOUT THE PROPOSED PHASING

The project could be developed as proposed but be built in one extended development period rather than being built in three phases. This alternative would involve essentially the same impacts as proposed phased development, but would concentrate

the construction impacts into a shorter period of time. Project neighbors would still be inconvenienced by construction impacts but would not have to look forward to them for such a long period. Long-term exposure of graded, undeveloped house sites would be reduced, and landscaping of lots by individual owners would be expected to occur within a shorter period of occupancy rather than occurring over a period of several years, thereby accelerating the time required for maturation of overall project landscaping. It is not known whether the project could be completed in one construction season, but even if two seasons were required, the period of construction impacts would be substantially reduced. (The timing of construction activities on the three lots which would not be developed as part of the proposed project can not be predicted.)

D. DEVELOPMENT WITH IMPORTED FILL

With the importation of fill from off-site, the project could be developed essentially as proposed, but with reduced need for cutting into the lower canyon slopes to generate fill material. From the City's and neighborhood's point of view, the primary drawback to this alternative would be the required heavy-truck traffic. Five-axle bottom-dump trucks (two trailers) can haul about 15 to 22 cubic yards of material, depending on the material's composition and volume weight. Thus, if 12,000 cubic yards of material were imported, about 545 to 800 round trips would be required by such trucks. If smaller trucks were required, to reduce maneuvering difficulties at the site and along the roadway route to the site, more trips would be required.

If canyon-floor fill were imported, some fill would still be generated on-site because it would still be necessary to set the houses far enough back from the street to accommodate driveways, and the required setbacks would, in turn, require enough lower-slope excavation to at least accommodate garage foundations. Thus, it could be anticipated that less than the proposed 12,000 cubic yards of fill would have to be imported. Even so, it could be anticipated that importation would require a major transportation effort involving hundreds of truck trips, which would greatly increase short-term traffic congestion and the potential for safety hazards and roadway damage.

From the applicant's point of view, the primary drawback to this alternative would be the expense of hauling the fill, and the need to locate a ready source of fill with suitable quality, volume, and location.

The extent to which this alternative would require changes in project design is not known, and would involve analysis which is beyond the scope of the EIR. Because the major volume of fill would not be cut from the slopes of the site, it might be possible to preclude or reduce the need for large, continuous retaining walls. Retaining structures in the foundations of the houses would still be needed, and it might still be necessary to have upslope retaining walls, but with less wall height than proposed. With less excavation and retention of more of the existing slopes, houses would be sited at higher elevations than proposed, which would generally increase their visibility and might require steep driveway approaches to garages, or large retaining walls around garages in order to maintain moderate driveway grades.

E. DEVELOPMENT WITH LIMITED CANYON-FLOOR EARTHWORK

It might be possible for the site to be developed with a new street at or near the elevation of the existing canyon floor. This would reduce, but not preclude, project-site earthwork. Under this alternative, the street would be built at approximately the elevation of the existing canyon-floor dirt road, with roadbed fill limited to the volume of earth which would have to be excavated from individual house sites (assuming balanced cut and fill on-site, with no material exported). Such development would generally maintain the steep slopes of the site, thereby precluding need for the proposed upslope retaining walls, but introducing a new set of development constraints.

Because building sites would be located on existing steep slopes immediately above the roadway, the primary constraint would probably be the need for very large, reinforced concrete walls adjacent to the roadway, to accommodate garage access for each unit. Such construction along both sides of the roadway would have major visual impact, and could result in less driveway parking area than is currently proposed because of the need to keep the garages and walls close to the street. It is also possible that cutting into the toes of the project-site slopes could result in potential geologic problems equivalent to, or greater than, potential problems associated with the proposed slope excavation and upslope retaining walls.

As noted at the beginning of the EIR, the City requires a grading permit for earthwork involving the movement of 50 cubic yards or more of material. Also, it is understood that, because of the applicant's ownership of a series of abutting lots, the City could limit house construction to three units per year. Thus, it appears that if the applicant were able to build an acceptable street without a grading permit being required, it might be possible thereafter to complete development of the site at a rate of three units per year, over a period of five or six years, without recourse to an EIR, by going through the normal building-permit procedure. The extent to which such a procedure would be possible is not known, and would require a detailed level of analysis which is beyond the scope of this EIR.

F. DEVELOPMENT WITH PERMANENT RETAINING WALLS

The applicant is proposing tiered wood retaining walls above 12 of the proposed houses. Although well-built wood walls could perform well, they have a shorter life-expectancy than concrete walls, and relatively high long-term maintenance costs when compared with other types of walls. It is assumed that wood walls have been proposed because they are considered to be aesthetically superior to concrete walls and cost less to construct. Alternatives to wood walls include poured-in-place concrete walls, welded wire baskets (filled with stone and anchored to the slope), and concrete crib walls and similar bin walls made of steel which acquires a protective coating of rust. (Figures 41 and 42 provide sample illustrations of concrete crib walls, with Figure 41 showing such walls with varying degrees of vegetative cover. Similar vegetative cover can be achieved with wire baskets. Wire basket retention is among the several methods discussed in Appendix F, in "Alternative Earth Retaining Systems in California Highway Practice," by CalTrans.)

Concrete crib walls and wire baskets have the aesthetic advantage that vegetation can grow through them and, if well tended, eventually result in complete coverage. The costs of crib walls and welded wire baskets are comparable to one another and

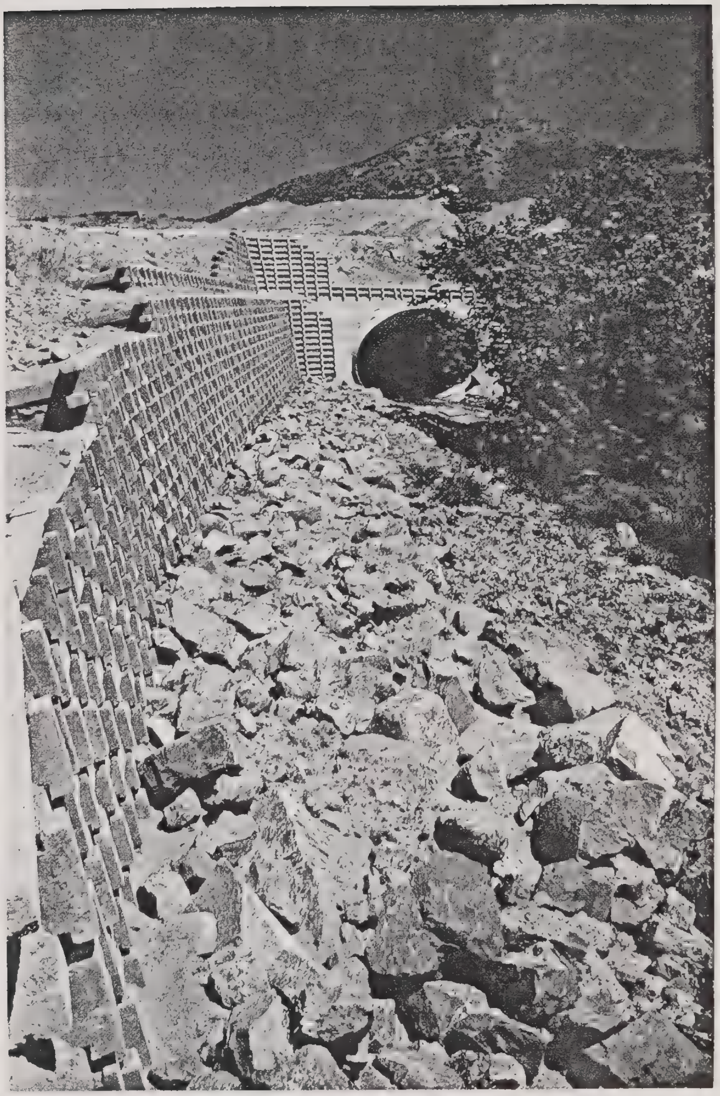
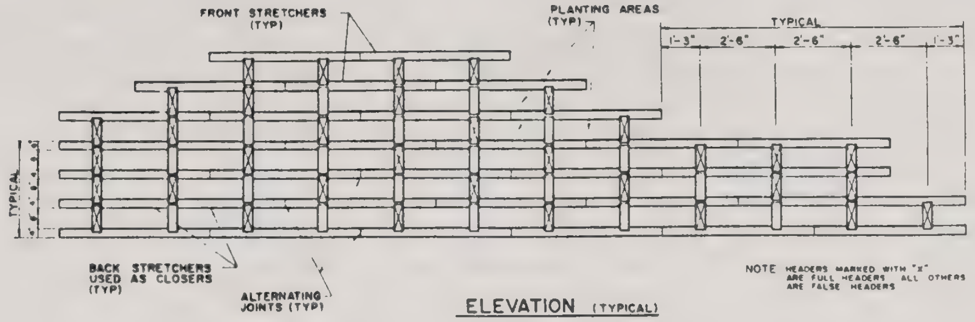
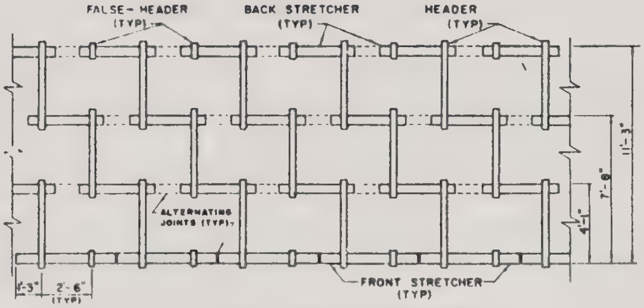


Figure 41.

Sample illustrations of concrete crib wall construction. This type of wall is an alternative to the tiered wood walls proposed for the project.



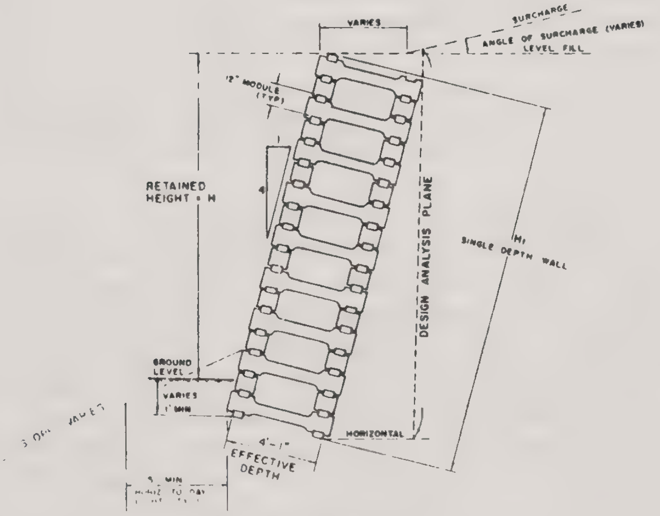
ELEVATION (TYPICAL)



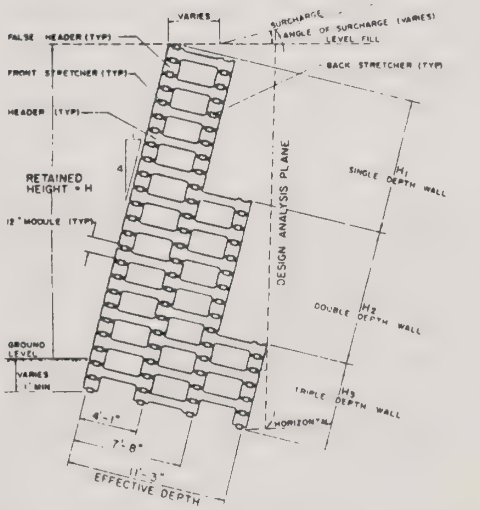
PLAN VIEW BASE COURSE
(TYPICAL MULTIPLE DEPTH WALL)

CONSTRUCTION NOTES:

1) USE OF FALSE HEADERS
   A) FALSE HEADERS ARE NOT ALLOWED AT ENDS OF WALLS OR IN TOP COURSE OF WALLS.
   B) FALSE HEADERS ARE NOT USED IN INTERIOR OF MULTIPLE-DEPTH WALLS.
2) UNSUPPORTED HEIGHT AT ENDS OF WALLS NOT TO EXCEED 4 FEET
3) SPECIAL NOTE SHALL BE TAKEN OF ALTERNATING-JOINT CONSTRUCTION, AS SHOWN IN TYPICAL CROSS-SECTIONS, BASE COURSE PLAN VIEW, AND ELEVATION



CROSS SECTION
(TYPICAL SINGLE DEPTH WALL)



CROSS SECTION
(TYPICAL MULTIPLE DEPTH WALL)

Criblock

Retaining Walls Company

CRIB RETAINING WALL ERECTION

Figure 42.

Sample plans showing the construction of a concrete crib wall.

are generally less than the cost of solid concrete walls. All three types, though, have a life expectancy of more than 50 years and will require little maintenance. Crib walls and wire baskets need to be founded on competent material. A single wall 10 to 12 feet in height could be expected to yield better foundation conditions (i.e., deeper below the surface) than a tiered arrangement, and would be more straightforward in its design and construction. Each possible type of wall has some advantages and disadvantages. The proposed tiered wood walls might have the short-term aesthetic advantage of weathered wood color and relative ease of screening, with less individual height to be screened and with trees and shrubs planted between the walls, but would provide less assurance of longevity and geologic stability than a concrete crib wall. On the other hand, a properly-constructed crib wall could be expected to perform well, maintenance-free, over a long period of time, but in the short-term might be more difficult to screen with vegetation.

G. REDUCTION IN THE NUMBER OF PROJECT-SITE UNITS

The project site could be resubdivided to decrease the number of existing lots, and thereby possibly decrease the amount of required earthwork and other development impacts. Such an alternative, however, involves design analysis and legal and policy considerations which are beyond the scope of this EIR.

IIX. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Because of current residential land-use designation and legal status, with existing lots of record and public right-of-way access, the project site has no major employment-production potential. Even if the site were not already subdivided for residential use, its access characteristics, terrain, and surrounding residential land uses would preclude any commercial use which could result in a practical level of employment production. The site does not have commercial agricultural or mineral value; it is not a major scenic feature of the Oakland Hills area; and does not have outstanding geologic, vegetative, or wildlife characteristics which are of areawide, citywide, or regional significance.

The site does have scenic value for immediately-surrounding neighbors, and does provide a neighborhood-scale element of vegetation and wildlife habitat within the overall mosaic of hill-area residential development. To the extent that the project would disrupt these features, the short- and intermediate-term aesthetics of the site would be compromised, notwithstanding the fact that development would be consistent with City plans and policies and the site's subdivided configuration. In the long term, with maturation of landscaping, it could be expected that the aesthetic character of the site would reach a level consistent with the surrounding developed area.

The project would not have major long- or short-term effects on housing, employment, or population. Minor, short-term employment would be provided during construction, and project households could be expected to generate demand for commercial residential services which are typical of Oakland Hills residential areas. The project would make a minor addition to the City's housing stock and a minor increase in project-area population. As noted previously, project occupancy would not be expected to have significant impacts on public services or utilities, and would require no major utility or public works improvements.

Assuming adequate mitigation of potential development and circulation impacts, as discussed elsewhere in the EIR, the project would pose no significant long-term risks to health or safety.

IX. IRREVERSIBLE ENVIRONMENTAL CHANGES ACCOMPANYING THE PROJECT

With development as proposed, the project site would be irreversibly changed from vacant hillside land to developed, single-family residential land.

X. BIBLIOGRAPHY

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File No. ER 88-11
Ref. No. TPM 5393

City of Oakland
Oakland, California

INITIAL STUDY
California Environmental Quality Act

I. DESCRIPTION OF THE PROJECT SEE ATTACHED

II. DESCRIPTION OF THE ENVIRONMENTAL SETTING SEE ATTACHED

III. ENVIRONMENTAL EFFECTS

	Yes	Maybe	No	Source or Explanation
Geophysical. Will the proposal result in:				
1. Unstable earth conditions, including erosion or slides, or changes in geologic substructures either on or off the site?		X		See Attachment
2. Major changes in topography or ground surface relief features?	X			See Attachment
3. Construction on loose fill or other unstable land which might be subject to slides or liquefaction during an earthquake?		X		See Attachment
4. Construction within one quarter mile of an earthquake fault?			X	
5. Substantial depletion of a nonrenewable natural resource or inhibition of its extraction?			X	
Air and Water. Will the project result in:				
6. Substantial air emissions, deterioration of ambient air quality or the creation of objectionable odors?			X	
7. Substantial degradation of water quality?				See Attachment
8. Changed drainage patterns or increased rates or quantities of surface water runoff?	X			See Attachment
9. Interception of an aquifier by cuts or excavations?		X		See Attachment
Biotic. Will the project:				
10. Reduce the quantity of fish and wildlife in the project vicinity, interfere with migratory or other natural movement patterns, degrade existing habitats or require extensive vegetation removal?		X		See Attachment
11. Reduce the numbers of any rare or endangered species of plants or animals?		X		See Attachment
Land Use and Socio-Economic Factors. Will the project:				
12. Conflict with approved plans for the area or the Oakland Comprehensive Plan?			X	
13. Carry the risk of an explosion or the release of hazardous substances, including oil, pesticides, chemicals or radiation?			X	
14. Require relocation of residents and/or businesses?			X	
15. Cause a substantial alteration in neighborhood land use, density or character?			X	
16. Generate substantially increased vehicular movement or burden existing streets or parking facilities?	X			See Attachment
17. Elicit substantial public controversy or opposition?	X			" "
18. Have a substantial impact on existing transportation systems or circulation patterns?	X			" "
19. Result in a substantial increase of the ambient noise levels for adjoining areas?		X		" "
20. Impose a burden on public services or facilities including fire, solid waste disposal, police, schools or parks?		X		" "
21. Impose a burden on existing utilities including electricity, gas, water, and sewers?		X		" "
22. Destroy, deface or alter a structure, object, natural feature or site of historic, architectural, archeological or aesthetic significance?			X	
23. Involve an increase of 100 or more feet in the height of any structure over any previously existing adjacent structure?			X	

Energy: Will the project:	Yes	Maybe	No	Source or Explanation
24. Use or encourage use of substantial quantities of fuel or energy?			X	

IV. MANDATORY FINDINGS OR SIGNIFICANCE (EIR required if answer to any of the following questions is "yes" or "maybe".)

	Yes	Maybe	No
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	X		
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)		X	
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	X		
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X

If any "yes" or "maybe" answers are marked, describe the specific nature of the environmental effects involved and their relationship to the project. (Use an attached sheet if necessary.)

V. DETERMINATION:

On the basis of this initial evaluation:

☐ I find the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

☒ I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Name WILLIE YEE   Date March 24, 1988

Title Associate Planner

ATTACHMENT TO INITIAL STUDY

I. Description of the Project

Beaconsfield Place is a "paper street," meaning that it is mapped as a designated City street but has not been constructed. Artek, Inc. is proposing to construct Beaconsfield Place in order to serve 18 new single family residences. The applicant will need to obtain a grading permit and parcel map to develop the site according to the submitted plans. Both the grading permit and parcel map, are subject to the requirements of the California Environmental Quality Act.

The new street will be approximately 550 to 600 feet long and will terminate in a 50 foot wide cul-de-sac. The street will be 30'-0" wide from curb to curb. The applicant intends to use the material generated from excavation of the 18 homes to raise the grade of the roadway, approximately 12,000 cubic yards according to the applicant. The depth of the fill will be as much as 20'-0" above the grade of the existing rough graded roadway.

All the proposed residences will be upslope homes with two to three levels above an excavated garage. Cribwall type retaining walls of up to 12'-0" in height will be used for the homes.

The applicant has indicated that three pine trees and three cypress trees will be removed. All oaks over 4" in diameter will be retained. Liquid Ambers are proposed as replacement trees.

II. Description of the Environmental Setting

Vacant three acre site located along the unimproved portion of Beaconsfield Place, east of Keswick Court. Site consists of a canyon floor with steep slopes ranging from 1:1 (horizontal to vertical) to about 2-1/2:1. There is a rough graded roadway running the length of the canyon floor. An exposed corrugated metal drainage pipe (broken) is located to the left of the graded roadway. Water from two drainage courses located at the east end of the site, and from the north and south slopes of the canyon, flows within the trench containing the metal pipe to a storm drain located at the end of the existing street pavement. There are numerous tree strips and debris left over from recent tree removals on the canyon floor and lower slopes. The site is surrounded by single family residences along the rim of the canyon and along Beaconsfield Place, Keswick Court, and Chelton Drive.

III. Environmental Effects

Geophysical - A foundation investigation prepared by Alan Kropp and Associates found that the surficial soils on the slopes are loose and quite weak, and may be subject to sloughing if oversteepened or saturated. There is presently some evidence of shallow sloughing on the site. The project will drastically alter the existing topography by significant excavation for home construction, and the depositing of up to 12,000 cubic yards of fill along the canyon floor to build the roadway.

Air and Water - The existing drainage courses at the east end of the canyon floor will be affected by the construction of homes. The trench containing the metal drain pipe will be buried by road construction. The location of new homes along both slopes of the canyon will also alter existing drainage patterns. Ground water percolation will be reduced by the introduction of more hard surfaces (road, driveways, roofs). Water quality may also be affected by gasoline and oil residues washing off of the roadway during the rainy season and flowing to downstream facilities. The foundation investigation report did not establish conclusively where the depth of groundwater is, or that there are no aquifers on this site.

Biotic

Development of this site will reduce the amount of animal habitats and require the removal of six trees. It is unknown whether this site is within the range of any rare or endangered species, or if there are any protected plants present.

Land Use and Socio-Economic Factors

The street system that will serve this development is substandard. Keswick Court is at same points barely 10-15 feet wide. Chelton Drive is also quite narrow at some locations.

There may also be sight distance problems on some streets. This project has generated significant public opposition based upon its potential geotechnical, traffic, and drainage impacts. Noise generation by the development will travel up the canyon walls and may disturb neighboring residents. The excessive length of the deadend street (600' proposed: 300' allowed) may affect fire services. It is not known whether off-site sewer and drainage facilities will require upgrading to serve this development.

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B-1

CITY OF OAKLAND
Interoffice Letter

To: Zoning Division Attention: Mr. Willie Yee Date: October 24, 1988

From: Police Department
Lieutenant F. Peoples - CSD

Subject: Beaconsfield Street Extension

We have reviewed the Administrative Draft EIR for the Beaconsfield Street extension and residential development.

We recommend the following security features which could reduce the impact of this development on police services.

- All residences should display a clearly visible address, no less than 6" in height.
- All exterior doors, and doors leading to the interior from the garage should be 1-3/4" thick solid core in construction.
- All exterior doors should be equipped with the following:
  - 1" deadbolt locks, twin cylinder with key retaining feature.
  - 190° optical viewer, front door only.
  - Maximum security strike plates on all deadbolt locks.
  - Non-removable hinge pins on all exterior doors.

If you have any questions, please call Officer Curt Wengeler or me at extension 3066.

Freddie L. Peoples
Lieutenant of Police
Community Services Division

FLP:jka

RECEIVED
OCT 2 1988
PLANNING COMMISSION
ZONING DIVISION

900-10

CITY OF OAKLAND
Interoffice Letter

To: City Planning Attention: Willie Yee Date: November 3, 1988

From: OPW - Engineering Services

Subject: ADEIR - Beaconsfield Street Extension

RECEIVED
NOV 2 1988
PLANNING COMMISSION
ZONING DIVISION

The comments for the subject project are as follows:

1. The sanitary sewer in the land fill area should be reconstructed to a maximum depth of 6 feet below the finished grade unless specifically approved otherwise. (Note: issuance of grading permit will be contingent on the developer's conformance to this requirement).
2. New sidewalk will be required adjacent to the street frontage.
3. Procedures and responsibilities for the continuous maintenance of the proposed drainage facilities outside the Public Right-of-Way need to be provided.
4. Trash rack (debris catcher) or settlement basin needs to be considered for the proposed stormdrain headwell near the northeast site boundary (Fig. 6, P.8).
5. Roadway subdrain needs to be considered as described by Alan Kopp & Associates on Appendix F.

WARREN BOYD
Supervising Civil Engineer

WB:ge

900-10

CITY OF OAKLAND
Interoffice Letter

To: CITY PLANNING Attention: JULIAN W. CARROLL Date: 3/9/88

From: JAMES E. ART, P.E. - FIRE PREVENTION BUREAU

Subject: TPN 5393
2683 TO 87 BEACONFIELD PLACE
ADDITIONAL LOT

Fire Prevention Review Comments:

Located in critital fire area at far end of impassible. unimproved street in excess of 300 feet dead end with no fire hydrant on steep hill terrain. Makes poor situation worse from fire viewpoint.

Recommend denial, or conditional approval based on all of the following mitigation measures:

1. Install paved street at least 30 Ft. unobstructed with at least 50 diameter turnabout.

2. Provide adequate fire hydrants to Fire Marshal's satisfaction with one hydrant within 100 feet of dead end.

3. Provide fire sprinklers throughout each house in accordance with either the Uniform Building Code Standard 38-1, or Oakland Level II.

4. Provide hard wired smoke detectors at least outside of each sleeping area to code. Interconnected smoke detector would be better.

5. No gates or other access limiters.

6. Provide large clear address signs.

7. Clear weeds and brush at least 30 ft. to building and maintain clear.

8. Fire retardant roof covering (Class "A" recommended.)

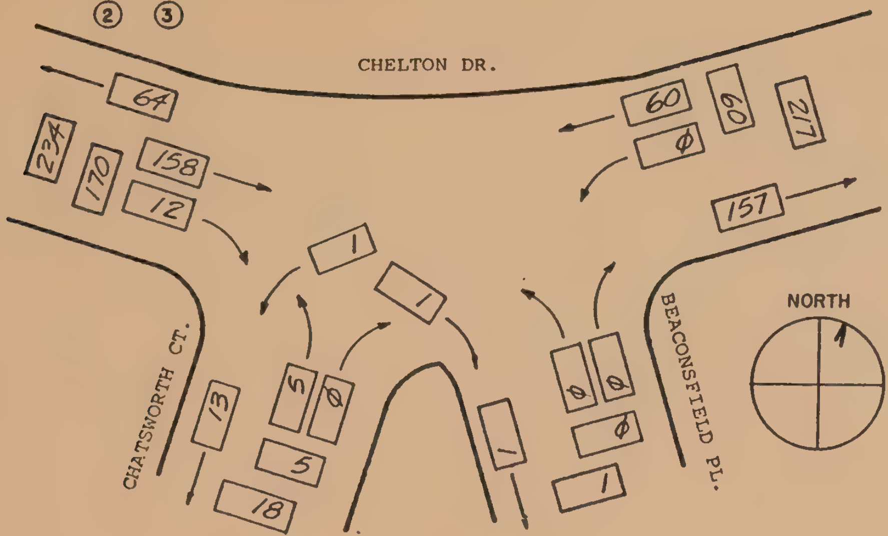
600-10

LOCATION CHELTON DRIVE/CHATSWORTH COURT/BEACONSFIELD PLACE

DATE 7-12-88 TIME 4:30-6:30 PM PEAK HOUR 5:15-6:15 PEAK TOTAL 236

TIME	① R	① S	② R	② L	③ R	③ L	④ S	④ L	TOTAL
4:30	1	30	–	1	–	–	15	–	47
45	3	38	–	1	1	1	18	–	62
5:00	1	27	–	–	–	–	15	–	43
15	8	39	–	–	–	–	15	–	62
TOTAL	13	134	–	2	1	1	63	–	214
5:30	1	34	–	2	–	1	17	–	55
45	2	46	–	–	–	–	17	–	65
6:00	1	39	–	3	–	–	11	–	54
15	3	33	–	1	–	–	9	–	46
TOTAL	7	152	–	6	–	1	54	–	220
ALL TOTAL	20	286	–	8	1	2	117	–	434
PEAK HOUR	12	158	–	5	–	1	60	–	236

PEAK HOUR:

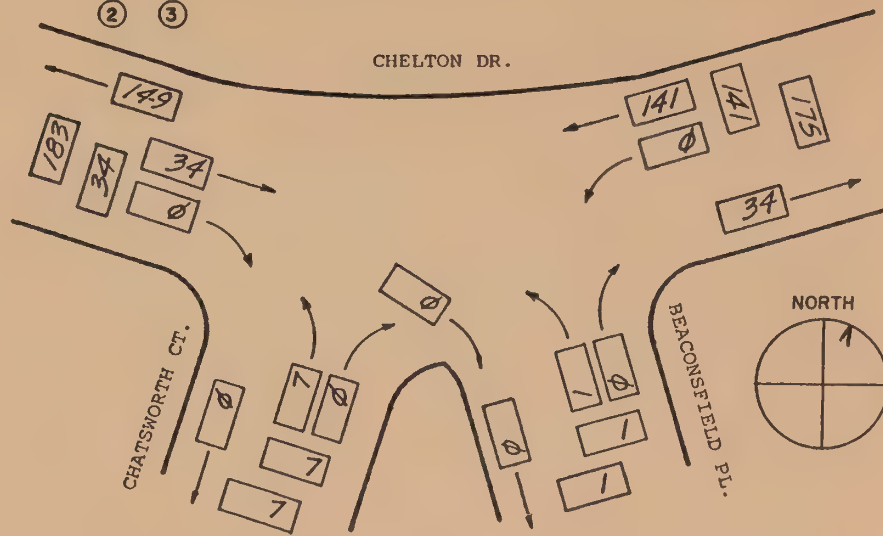


LOCATION CHELTON DRIVE/CHATSWORTH COURT/BEACONSFIELD PLACE

DATE 7-12-88 TIME 7-9 AM PEAK HOUR 7:15-8:15 PEAK TOTAL 183

TIME	① R	① S	② R	② L	③ R	③ L	④ S	④ L	TOTAL
7:00	1	1	–	2	–	–	24	–	28
15	–	6	–	3	–	–	39	–	48
30	–	5	–	2	–	1	38	–	46
45	–	12	–	1	–	–	34	–	47
TOTAL	1	24	–	8	–	1	135		169
8:00	–	11	–	1	–	–	30	–	42
15	–	4	–	6	–	–	33	–	43
30	–	13	–	2	–	1	33	–	49
45	1	10	–	1	1	1	30	–	44
TOTAL	1	38	–	10	1	2	126	–	178
ALL TOTAL	2	62	–	18	1	3	261		347
PEAK HOUR	–	34	–	7	–	1	141		183

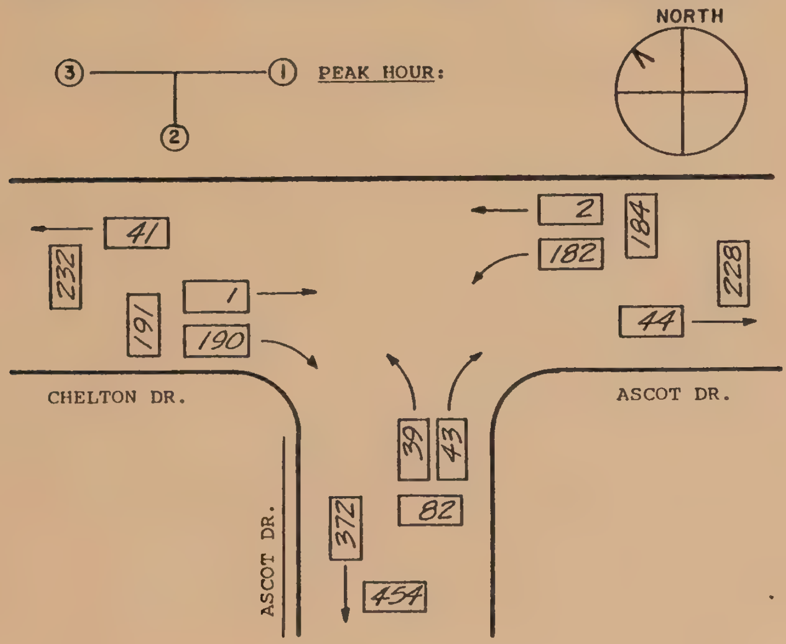
PEAK HOUR:



LOCATION ASCOT DRIVE AND CHELTON DRIVE

DATE 7-13-88 TIME 7-9 AM PEAK HOUR 7:30-8:30 PEAK TOTAL 457

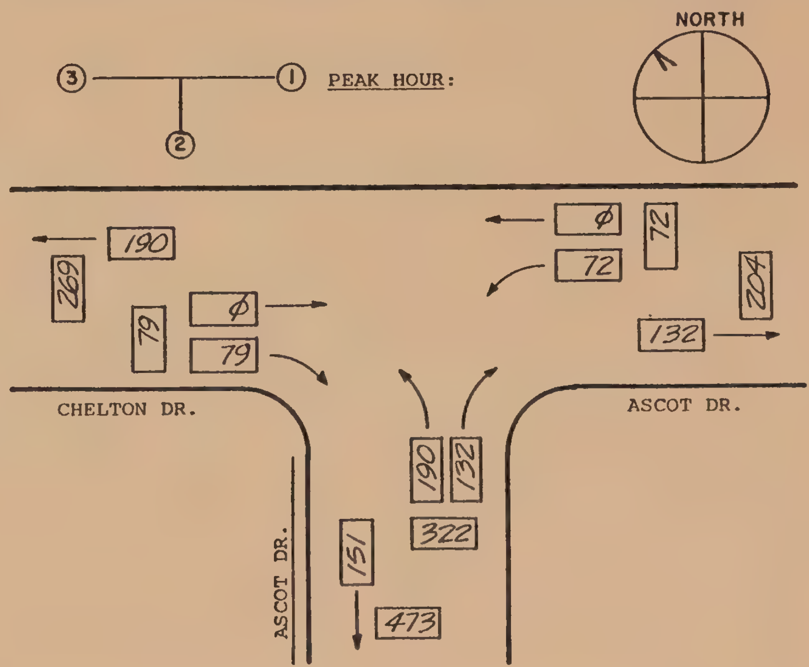
TIME	① S	① L	② R	② L	③ S	③ R	TOTAL
7:00	–	29	7	3	–	36	75
15	–	30	3	4	–	48	85
30	–	43	8	9	–	48	108
45	–	52	16	10	–	48	126
TOTAL	–	154	34	26	–	180	394
8:00	2	45	7	12	1	49	116
15	–	42	12	8	–	45	107
30	1	34	5	15	–	45	100
45	–	29	10	16	–	42	97
TOTAL	3	150	34	51	1	181	420
ALL TOTAL	3	304	68	77	1	361	814
PEAK HOUR	2	182	43	39	1	190	457



LOCATION ASCOT DRIVE AND CHELTON DRIVE

DATE 7-13-88 TIME 4:30-6:30 PM PEAK HOUR 5:30-6:30 PEAK TOTAL 473

TIME	① S	① L	② R	② L	③ S	③ R	TOTAL
4:30	–	21	22	25	–	24	92
45	–	11	22	29	–	16	78
5:00	–	22	25	38	–	13	98
15	–	12	36	34	1	22	105
TOTAL	–	66	105	126	1	75	373
5:30	–	20	41	53	–	18	132
45	–	14	33	48	–	11	106
6:00	–	20	33	42	–	30	125
15	–	18	25	47	–	20	110
TOTAL	–	72	132	190	–	79	473
ALL TOTAL	–	138	237	316	1	154	846
PEAK HOUR	–	72	132	190	–	79	473



D-3

VEHICLE COUNTS ON MOUNTAIN BLVD. NEAR ASCOT

CITY OF OAKLAND — TRAFFIC ENGINEERING DEPARTMENT

DAY & DATE	THURS, 7-27 1978	THURS, 7-27 1978	DAY & DATE
WEATHER & MISC.	FAIR	FAIR	WEATHER & MISC.
DIRECTION	WEST BOUND	EAST BOUND	DIRECTION
LOCATION	W OF ASCOT	W OF ASCOT	LOCATION

VEHICLES COUNTED

	WEST BOUND	EAST BOUND	
12 – 1 AM	15	52	12 – 1 AM
1 – 2	9	26	1 – 2
2 – 3	8	20	2 – 3
3 – 4	5	4	3 – 4
4 – 5	2	1	4 – 5
5 – 6	15	1	5 – 6
6 – 7	118	15	6 – 7
7 – 8	289	62	7 – 8
8 – 9	316	109	8 – 9
9 – 10	250	108	9 – 10
10 – 11	227	127	10 – 11
11 – 12 NOON	212	171	11 – 12 NOON
12 – 1 PM	207	214	12 – 1 PM
1 – 2	204	223	1 – 2
2 – 3	185	217	2 – 3
3 – 4	185	254	3 – 4
4 – 5	193	310	4 – 5
5 – 6	171	484	5 – 6
6 – 7	198	279	6 – 7
7 – 8	183	259	7 – 8
8 – 9	133	175	8 – 9
9 – 10	90	137	9 – 10
10 – 11	77	111	10 – 11
11 – 12 MIDN	36	91	11 – 12 MIDN
24-HR. TOTAL	3328*	3450*	24-HR. TOTAL

	WEST BOUND	EAST BOUND	
7:00 – 7:15 AM	57	4	7:00 – 7:15 AM
7:15 – 7:30	61	9	7:15 – 7:30
7:30 – 7:45	86	28	7:30 – 7:45
7:45 – 8:00	85	21	7:45 – 8:00
8:00 – 8:15	94	3	8:00 – 8:15
8:15 – 8:30	70	36	8:15 – 8:30
8:30 – 8:45	81	29	8:30 – 8:45
8:45 – 9:00	71	40	8:45 – 9:00
4:00 – 4:15 PM	43	47	4:00 – 4:15 PM
4:15 – 4:30	40	69	4:15 – 4:30
4:30 – 4:45	55	87	4:30 – 4:45
4:45 – 5:00	55	107	4:45 – 5:00
5:00 – 5:15	44	72	5:00 – 5:15
5:15 – 5:30	56	142	5:15 – 5:30
5:30 – 5:45	36	125	5:30 – 5:45
5:45 – 6:00	35	135	5:45 – 6:00

REMARKS:

987-020 (4 67) TC467

VEHICLE COUNTS ON ASCOT NEAR MOUNTAIN BLV

CITY OF OAKLAND — TRAFFIC ENGINEERING DEPARTMENT

DAY & DATE	TUES, 8-1 1978	, 19	DAY & DATE
WEATHER & MISC.	FAIR		WEATHER & MISC.
DIRECTION	BOTH BOUND	BOUND	DIRECTION
LOCATION	N OF MOUNTAIN	OF	LOCATION

VEHICLES COUNTED

	BOTH BOUND		
12 – 1 AM	85		12 – 1 AM
1 – 2	17		1 – 2
2 – 3	12		2 – 3
3 – 4	6		3 – 4
4 – 5	7		4 – 5
5 – 6	20		5 – 6
6 – 7	143		6 – 7
7 – 8	391		7 – 8
8 – 9	492		8 – 9
9 – 10	351		9 – 10
10 – 11	356		10 – 11
11 – 12 NOON	366		11 – 12 NOON
12 – 1 PM	378		12 – 1 PM
1 – 2	350		1 – 2
2 – 3	351		2 – 3
3 – 4	378		3 – 4
4 – 5	484		4 – 5
5 – 6	617		5 – 6
6 – 7	532		6 – 7
7 – 8	383		7 – 8
8 – 9	329		8 – 9
9 – 10	216		9 – 10
10 – 11	176		10 – 11
11 – 12 MIDN	148		11 – 12 MIDN
24-HR. TOTAL	6590*		24-HR. TOTAL

	BOTH BOUND		
7:00 – 7:15 AM	60		7:00 – 7:15 AM
7:15 – 7:30	84		7:15 – 7:30
7:30 – 7:45	123		7:30 – 7:45
7:45 – 8:00	124		7:45 – 8:00
8:00 – 8:15	153		8:00 – 8:15
8:15 – 8:30	113		8:15 – 8:30
8:30 – 8:45	103		8:30 – 8:45
8:45 – 9:00	123		8:45 – 9:00
4:00 – 4:15 PM	105		4:00 – 4:15 PM
4:15 – 4:30	113		4:15 – 4:30
4:30 – 4:45	126		4:30 – 4:45
4:45 – 5:00	140		4:45 – 5:00
5:00 – 5:15	141		5:00 – 5:15
5:15 – 5:30	151		5:15 – 5:30
5:30 – 5:45	165		5:30 – 5:45
5:45 – 6:00	160		5:45 – 6:00

REMARKS:

987-020 (4 67) TC467

VEHICLE COUNTS ON ASCOT NEAR CHELTON

CITY OF OAKLAND TRAFFIC ENGINEERING DEPARTMENT

DAY & DATE	Wed. 1/26 1977	, 19	DAY & DATE
WEATHER & MISC.	Fair		WEATHER & MISC.
DIRECTION	BOTH BOUND	BOUND	DIRECTION
LOCATION	E OF CHELTON	OF	LOCATION

VEHICLES COUNTED

12 – 1 AM	20		12 – 1 AM
1 – 2	4		1 – 2
2 – 3	6		2 – 3
3 – 4	1		3 – 4
4 – 5	2		4 – 5
5 – 6	8		5 – 6
6 – 7	37		6 – 7
7 – 8	36		7 – 8
8 – 9	203		8 – 9
9 – 10	137		9 – 10
10 – 11	109		10 – 11
11 – 12 NOON	120		11 – 12 NOON
12 – 1 PM	110		12 – 1 PM
1 – 2	96		1 – 2
2 – 3	83		2 – 3
3 – 4	161		3 – 4
4 – 5	181		4 – 5
5 – 6	201		5 – 6
6 – 7	179		6 – 7
7 – 8	123		7 – 8
8 – 9	74		8 – 9
9 – 10	100		9 – 10
10 – 11	62		10 – 11
11 – 12 MIDN	37		11 – 12 MIDN
24-HR. TOTAL	2,090		24-HR. TOTAL

7:00 – 7:15 AM	17		7:00 – 7:15 AM
7:15 – 7:30	30		7:15 – 7:30
7:30 – 7:45	44		7:30 – 7:45
7:45 – 8:00	45		7:45 – 8:00
8:00 – 8:15	40		8:00 – 8:15
8:15 – 8:30	62		8:15 – 8:30
8:30 – 8:45	52		8:30 – 8:45
8:45 – 9:00	49		8:45 – 9:00
4:00 – 4:15 PM	35		4:00 – 4:15 PM
4:15 – 4:30	36		4:15 – 4:30
4:30 – 4:45	58		4:30 – 4:45
4:45 – 5:00	52		4:45 – 5:00
5:00 – 5:15	41		5:00 – 5:15
5:15 – 5:30	38		5:15 – 5:30
5:30 – 5:45	58		5:30 – 5:45
5:45 – 6:00	64		5:45 – 6:00

REMARKS:

537–028 (4 67) TC467

ARTEK

ARCHITECTS
CONTRACTORS
DEVELOPERS

May 23, 1988

Mr. Steven D. Billington
1226 Warner Court
Lafayette, CA 94549

RE: Construction Noise
Beaconsfield Place
Oakland, CA

Dear Mr. Billington:

E-1

As per the request outlined in the EIR Proposal, the following is provided in order to assist you with the analysis of the noise generated from the construction operations of the project.

A. Time to complete earthwork/subdivision improvements.

Due to the interelated balance between cut and fill earthwork operations, the earthwork is most likely to be completed in one operation as opposed to a phased construction process. The lengths of time required to complete the different operations are as follows:

Site Clearing	one week
Earthwork	three weeks
Retaining wall construction	four weeks
Utilities	three weeks
Street Improvements	three weeks
TOTAL TIME:	fourteen weeks

B. Earthwork Equipment.

The following equipment will be operated during the site clearing and earthwork operations:

No. 963 Caterpillar Loader
Rex 18 ton Pactor (sheepsfoot compactor)
D-6 Caterpillar Dozer
20 yard, 18 wheel dumptruck (semi)
10 yard, 10 wheel dumptruck

2231-A COMMERCE AVE.
CONCORD, CALIFORNIA
94520
415 686 4230

Generally, two of the three earthworking equipment (Loader, Pactor and Dozer) will be in operation at any one given time between 8:00 A.M. and 4:30 P.M. The trucks will only occasionally be used in the beginning to remove debri and vegetation.

C. Retaining Wall and Utility Equipment.

The retaining wall operation and utility construction will involve the use of the following equipment:

Case 450 Backhoe (or equivalent)
'Transfer' type dumptruck (double load, 10 yd. ea.)
10 yard, 10 wheel dumptruck

During wall construction, one or two backhoes will be in operation for a large part of the entire day. Dump trucks will arrive with material and leave within 10 minutes of arrival. There will be approximately 10 deliveries each day of the dumptrucks.

The utility construction will involve the intermittent use of the backhoe (perhaps 60% total of the 8 hr. day) and a dumptruck delivery approximately three times daily.

D. Construction Personnel.

The number of construction workers at any given time throughout the duration of the project will be approximately as follows:

Site Clearing	three men
Earthwork	6 men
Retaining Wall Construction	8 men
Utilities	6 men
Street Improvements	8 men
House Construction	25 men

Generally, one vehicle is driven to the job for each 1.5 to 2 workmen (i.e., some ride sharing). All vehicles can be parked within the project site area and not on adjacent streets. Therefore, no disruption of the existing roadway patterns within the immediate neighborhood is anticipated.

If you should require additional information, please call.

Sincerely,
ARTEK Inc.

Edward Patmont
President

BEACONSFIELD2:NOISE.LTR

ARTEK

ARCHITECTS
CONTRACTORS
DEVELOPERS

July 14, 1988

Mr. Steven D. Billington
1226 Warner Court
Lafayette, CA 94549

RE: Construction Noise
Beaconsfield Place
Oakland, CA

Dear Mr. Billington:

In responce to your request, the following is provided as additional information for your study of construction related noise.

As previously stated, the street improvements portion of the project will take approximately three weeks to complete. This work includes (1) laying baserock/finish grading, (2) asphalt paving, and (3) forming and paving the concrete curb and gutter. You will note on the improvement plans that no sidewalk is being proposed. Each of these three operations is described briefly below:

1) Laying Baserock/Finish Grading
Six to eight inches of baserock will be placed over the entire street area or approximately 300 cubic yards. This material will be trucked in by 18 wheel dumptrucks (semi) which will unload approximately 20 yds. of material each and then immediately leave the site to get more material. Therefore, a total of 15 loads will be dropped. This material will be spread and compacted with the use of two pieces of equipment as follows:
John Deer 450 Dozer
Rex 18 ton Pactor (smooth roller)
Both pieces of equipment will be in operation approximately 15 hours to complete this process.

2231-A COMMERCE AVE.
CONCORD, CALIFORNIA
91520
415 606 4230

2) Asphalt Paving
The entire street will be paved in two days. During each of the two days a 10 yard dump truck will make roughly five trips to the site with hot asphalt material. This material is deposited directly into a larger street paving asphalt paving machine such as a <u>Barber Greene BGS40</u>. Two small rollers will be used most of these two days such as a <u>Beuthling 300</u> for the fine edge work.

3) Forming/Pouring Concrete Curb & Gutter
There is approximately 950 lineal feet of concrete curb and gutter to be poured. This is approximately 75 cubic yards of concrete. All forming is done by hand (i.e., no equipment other than hand tools). Approximately eight concrete trucks will come to the site and release the fresh concrete directly into the forms. Each concrete truck will be on the site approximately 45 minutes with his engine running.

As regards the actual house construction process, this can not be analyzed with the same degree of precision as the street improvements. However, based on my experience, I estimate as follows:

a) Total construction time for an individual house is 6 - 8 months each. Doing 4 - 5 homes at one time will take roughly 7 - 10 months to complete.

b) On this particular project, very little, if any, large equipment is used. Perhaps a truck mounted crane to position roof trusses in place or a backhoe for 4 hours to hook-up the sewer. Lumber and other construction material is delivered to the site (in 3/4 ton - 2 ton size trucks) approximately 4 times daily.

Please call if I can be of further assistance.

Sincerely,
ARTEK Inc.

Ed Patmont /ms

Edward Patmont
President

EP/ms

BEACONSFIELD2:BILINGTO.LTR

Recommendation from applicant's
1989 geotechnical study

RECOMMENDATIONS

A. Earthwork

A.1. Clearing and Site Preparation

The site should be cleared of all obstructions including designated trees, any underground utility lines, and debris. Holes resulting from the removal of trees and underground obstructions that extend below the proposed finish grade should be cleared and backfilled with suitable material compacted to the requirements given below under Item A.6., Compaction. We recommend that the removal of any major trees and the backfilling operations for these excavations be carried out under the observation of the soil engineer, so that all roots are removed and the excavations are properly backfilled.

After clearing, the portions of the site to be developed which contain surface vegetation or organic laden topsoil should be stripped to an appropriate depth to remove these materials. At the time of our field investigation, we estimated that a stripping depth of approximately 2 inches would be required. The amount of actual stripping should be determined in the field by the soil engineer at the time of construction. The cleared and stripped materials should be removed from the site or stockpiled for later use in landscaping if desired.

A.2. Existing Fill in Beaconsfield Place

The existing fill soils in the rough graded portions of Beaconsfield Place should be removed and replaced as engineered fill compacted in accordance with the requirements given below under Item A.6. Compaction. Upon completion of the removal and recompaction operation, a subdrain constructed in accordance with the requirements presented below under Item B.1. Roadway Subdrain should be installed through these newly placed fill soils.

A.3. House Excavations

After the site is cleared and stripped, excavations for the homes can be made. We recommend that excavation work and construction of major retaining walls not be performed during the rainy winter months. As the excavations are made, temporary shoring should be used, as required, to prevent the movement of materials exposed in the face of the excavation. We recommend that the excavation and subsequent wall construction be continuous in order to minimize the length of time the temporary slope is exposed.

The excavated materials can be selectively stockpiled for backfill behind the wall. However, all excess materials derived from the excavation should be removed from the site. We recommend a representative of our firm be present as the excavation is made to determine if adverse geotechnical conditions are exposed. Based on our evaluation of the subsurface conditions and our experience with excavations for other buildings in similar subsurface materials, it is our opinion that excavation of these materials will be variable. The surficial soils and severely weathered bedrock can be easily excavated; however, areas of moderately weathered bedrock may be more difficult to excavate. Where difficult excavation is encountered, heavier equipment may be required.

RECOMMENDATIONS
A. Earthwork (Continued)

A.4. Subgrade Preparation

After the site excavations are made, the exposed soils in those areas to receive structural fill, slabs-on-grade or pavements should be scarified to a depth of 6 inches, moisture conditioned to slightly above optimum water content and compacted to the requirements for structural fill.

A.5. Material for Fill

All on-site soils below the stripped layer and having an organic content of less than 3 percent by volume can be used as fill except where non-expansive import is required beneath the slabs. However, all fill placed at the site, including on-site soils, should not contain rocks or lumps larger than 6 inches in greatest dimension with not more than 15 percent larger than 2.5 inches. In addition, the required import fill should be predominantly granular with a plasticity index of 12 or less.

A.6. Compaction

All structural fill less than 5 feet thick should be compacted to at least 90 percent relative compaction as determined by ASTM Test Designation D 1557-78, except for the upper 6 inches of subgrade soils under pavements which should be compacted to at least 95 percent relative compaction. Structural fill or wall backfill greater than 5 feet high should be compacted to at least 95 percent relative compaction. Fill material should be spread and compacted in lifts not exceeding 8 inches in uncompacted thickness. We should note that if construction proceeds during or immediately after the wet winter months, it may require time to dry the on-site soils to be used as fill since their moisture content will probably be appreciably above optimum.

A.7. Trench Backfill

Pipeline trenches should be backfilled with fill placed in lifts not exceeding 8 inches in uncompacted thickness. The following table presents our recommendations for compaction requirements.

RECOMMENDATIONS
A. Earthwork
A.7. Trench Backfill (Continued)

Condition	Trench Depth (ft)	Compaction Requirements* Native Soils	Granular Import Soils
Non-Improved Area	Any depth	85%	90%
Improved Area	Less than 5-feet	Upper 3-feet 90% Lower 2-feet 85%	Entire backfill 90%
	5-feet or greater but less than 8-feet	Entire backfill 90%	Entire backfill 95%
	8-feet or greater	Entire backfill 95%	Entire backfill 95%

*Assumes a reasonable "cushion" layer around the pipe.

E-2

If imported granular soil is used, sufficient water should be added during the trench backfilling operations to prevent the soil from "bulking" during compaction. In all of the cases outlined above, we recommend that the upper 6-inches of subgrade under pavement and baserock be compacted to at least 95% relative compaction. All compaction operations should be performed by mechanical means only. We recommend against jetting unless the backfill material is granular (sand or gravel) and the water used in jetting is able to rapidly flow out of the trench.

If granular backfill is used for utility trenches, we recommend that an impermeable plug or mastic sealant be used where utilities enter buildings to minimize the potential for free water or moisture to enter below them. Finally, because of the potential for catastrophic collapse of trench walls we recommend that the contractor carefully evaluate the stability of all trenches and use temporary shoring where appropriate. The design and installation of the temporary shoring should be wholly the responsibility of the contractor. In addition, all state and local regulations governing safety around such excavations should be carefully followed.

A.8. Slopes

We recommend that all cut slopes in intact, moderately weathered bedrock have a maximum inclination of 1.75:1 (horizontal to vertical); cut slopes in severely weathered bedrock or soils and all fill slopes should not be steeper than 2:1. All cut slopes should be contour rounded to provide smooth transitions from one slope inclination to the next. The surface of all fill slopes should be either back-rolled, or compacted beyond the limits of the slope and cut back in order to achieve satisfactory compaction. **We should note that this firm and our consulting engineering geologist should be allowed to examine all cut slopes at the time of construction in order to determine the degree of weathering and make recommendations as to maximum slope inclination.** For planning purposes, materials which lie within eight feet of the existing ground surface should be considered to be soil or severely weathered bedrock which should have a maximum inclination of 2:1.

RECOMMENDATIONS
A. Earthwork
A.8. Slopes

Any cut or fill slopes which are greater than 25 feet high, measured vertically, should contain horizontal drainage terraces at least 8 feet wide at intervals of no more than 25 feet vertically. When only one terrace is required, it should be located at mid-slope. We recommend that all cut slopes be evaluated in the field during construction to determine if any adverse geotechnical conditions are exposed.

A.9. Fill Placement on Slopes

Where fills are to be placed on existing slopes having inclinations steeper than 5:1, a base key should be excavated into competent materials at the toe of the new fill slope. The depth and extent of keys should be determined by the soil engineer in the field at the time of construction. However, all base keys should be at least 10 feet wide and should slope back into the hillside at a gradient of at least 2 percent.

In addition, if the fill slope is greater than 10 feet high, benches should be excavated in to the slope before placing the fill at vertical intervals of no more than 10 feet. These benches should be at least 10 feet wide. However, the actual dimensions of the benches should be determined by the soil engineer at the time of construction.

B. Drainage and Erosion Control

B.1. Roadway Subdrain

A subdrain should be constructed down the centerline of the valley, beneath the existing rough graded roadway. The approximate location of this subdrain is shown on Figure 2. The subdrain should consist of an 12-inch diameter, perforated pipe in a trench filled with open-graded rock which is wrapped in an approved, polyester, non-woven geotextile. The trench should be at least 24 inches wide, and should be extended into bedrock or to a depth of 4.0 feet, whichever is less. The pipe should be sloped at a minimum gradient of 3% and should outlet at the intersection of Beaconsfield Place and Keswick Court. The pipe should be placed in the trench with the perforations down on at least 4 inches of gravel bedding. In areas where fill is to be placed the gravel should be extended to the existing ground surface, in areas where no fill is planned the upper one foot of trench backfill should consist of compacted, on-site, relatively impermeable material. A detail of this recommended subdrain system is presented on Figure 6.

RECOMMENDATIONS

B. Drainage and Erosion Control (Continued)

B.2. Surface Gradients

Positive surface gradients should be provided in all areas of the development. All lots should be graded to provide for runoff of surface water and direct water away from buildings toward suitable discharge facilities. Ponding of surface water should not be allowed adjacent to the structures or on pavements. In areas that cannot be sloped to drain away from structures, yard drains should be provided to convey water down to the roadway. If patios are planned upslope of the residences, we recommend that they be paved to prevent erosion or weakening of the surface soil near the structure. The patio should be sloped to a central drain leading to suitable discharge facilities. Alternatively, if rear decks are planned, we recommend that the slope under the deck be covered with several inches of concrete similar to what is commonly used for rat-proofing. This rat-proofing should be sloped to drain away from the residences to suitable discharge facilities. The Landscape Architect on the project should be informed of this recommendation, and the grading contractor and landscape contractor on the job advised of this during construction.

B.3. Roof Water

Continuous gutters and downspouts leading to closed pipes should be provided at each structure; these pipes should transmit the water to an appropriate discharge facility.

F-3

B.4. Water on Slopes

In order to help minimize the potential for saturation, weakening and subsequent sloughing of the surficial soils on the slopes at the site from water flowing from properties upslope of the site, we recommend that v-ditches be constructed across the top boundaries of all the lots. These ditches should slope at a gradient of at least 2 percent to closed pipes which discharge onto the streets below.

B.5. Drainage of Fill Keys and Benches

The base key of all fill slopes greater than 10 feet high which are located on natural slopes should contain a perforated pipe to drain the key. In addition, it may also be necessary to construct drains at the base of benches below the new fill; however, a decision regarding the need for these drains should be made in the field at the time of construction.

B.6. Drainage of Slope Terraces

Horizontal drainage terraces on the surface of cut or fill slopes should be provided with paved "V" ditches. These ditches should slope at a gradient of at least 2 percent to an appropriate discharge facility.

RECOMMENDATIONS

B. Drainage and Erosion Control (Continued)

B.7. Additional Drainage Measures

If areas are exposed during the grading operations which indicate sources of seepage or instability, additional drainage measures will be recommended by the soil engineer.

B.8. Erosion Control

Grading should be restricted to the dry season, and basins should be provided in padded areas (eg. cul-de-sac) to detain runoff and trap sediments. All graded areas should be protected form erosion by spraying a hydromulch with a tackifier on the slopes prior to the onset of winter rains. On slopes steeper than 3:1, we recommend that use of a slope protection fabric such as "North American Green C 125" or an equivalent approved in advance by this firm.

C. Structures

C.1. Footing Foundations

We recommend that in areas where intact bedrock has been exposed by cutting into the hillside that conventional, continuous and isolated spread footings be employed.

All footings should extend at least 16 inches below the lowest adjacent finished grade. In addition, any footings located adjacent to utility trenches should also have their bearing surfaces below an imaginary 1:1 (horizontal to vertical) plane projected upward from the edge of the bottom of the adjacent trench.

At the above depths, the footings may be designed for an allowable bearing pressure of 2000 pounds per square foot due to dead loads, 3000 pounds per square foot due to dead plus live loads, and 4000 pounds per square foot for all loads, including wind or seismic. These allowable bearing pressures are net values; therefore, the weight of the footings can be neglected for design purposes. However, all footing should have a minimum width of 14 inches, and all continuous footings should be tied together with reinforcing steel.

We also recommend that any isolated footings or drilled piers on slopes steeper than 4:1 be tied together with tie-beams or grade beams that extend up and down the slope between the isolated footings and drilled piers, as well as across the slope.

Lateral load resistance for portions of the buildings or footings may be developed in friction between the bottom of the footing and the supporting bedrock. A friction coefficient of 0.40 is considered applicable. As an alternative, a passive resistance equal to an equivalent fluid weighing 350 pounds per cubic foot acting against the foundation may be used. If the foundations are poured neat against the rock, friction and passive resistance maybe used in combination.

RECOMMENDATIONS
C. Structures (Continued)

C.2. Pier and Grade Beam Foundations

We recommend that in areas where bedrock is not exposed at the ground surface that drilled, cast-in-place, straight-shaft piers that are designed to develop their load carrying capacity through friction between the sides of the piers and the surrounding subsurface materials be used. Friction piers should have a minimum diameter of 16 inches, and there should be at least a minimum center to center spacing of 2.5 times the shaft diameter between adjacent piers.

The piers should generally extend to a depth adequate to provide at least 8 feet of embedment into bedrock. Since bedrock was encountered at depths of 3 to 9 feet our borings in the building areas, the piers for the residences should generally extend to a minimum depth of about 11 to 17 feet below the existing ground surface. To determine whether these depths are adequate to carry the structural loads of the residences, allowable skin friction values of 800 pounds per square foot for dead plus live loads and 1200 pounds per square foot for all loads, including wind or seismic, can be used in the bedrock. These values can be used starting at the bedrock surface.

To minimize damage resulting from potential "creep" type movement, we recommend that all piers be designed to resist a uniform lateral pressure of 500 pounds per square foot acting against the projected diameter of the pier to a depth of 3 feet below the ground surface.

The bottom of pier excavations should be dry and reasonably free of loose cuttings and soil fall-in prior to installing reinforcing steel and placing concrete. Any accumulated water in pier excavations should be removed prior to placing reinforcing steel and concrete, or the concrete should be tremied to the bottom of the hole. Care should be taken during concrete placement to avoid "mushrooming" at the tops of the piers. Since the actual depths of the piers will have to be determined in the field, we recommend that the excavation of piers be performed under the observation of our firm to confirm that they are constructed in accordance with the recommendations presented herein.

The piers should be tied together with grade beams that extend up and down the slope between the piers, as well as across the slope between the piers. Maximum horizontal distance between the grade beams should be in the range of 20 feet. The grade beams should be designed to span between the piers in accordance with structural requirements. In order to minimize the possible detrimental effects of the expansive soils we recommend that either a 4-inch void be created at the bottom of all grade beams or the grade beam be designed to resist an uplift pressures of 2000 pounds per square foot. If a void is used, our firm should review and approve the method of forming the void prior to construction of the grade beams.

The floor system should be structurally supported and derive all of its support from the pier and grade beam foundation.

Lateral loads on the piers may be resisted by passive pressures acting against the sides of the piers. We recommend a passive pressure equal to an equivalent fluid weighing 400 pounds per square foot per foot of depth to a maximum value of 4000 pounds per square foot. This value can be assumed to be acting against 1½ times the diameter of the individual pier shafts starting 3 feet below the bottom of grade beams.

C.3. Slabs-on-Grade

We recommend that slabs-on-grade for the garages be supported directly on undisturbed natural materials or compacted fill. However, if both soil and bedrock materials are exposed at subgrade level, the bedrock materials should be over-excavated by at least 6 inches and replaced with compacted fill materials. Prior to final construction of the slabs, the subgrade surface should be proof-rolled to provide a smooth, firm surface for slab support.

The slabs should be appropriately reinforced according to structural requirements; concentrated loads may required additional reinforcing. Minor movement of the concrete slab with resulting cracking should be expected. The recommendations presented above, if properly implemented, should help minimize the magnitude of this cracking.

In any slab area where minor floor wetness would be undesirable, 4 inches of free drainage gravel should be placed beneath the floor slab to serve as a capillary barrier between the subgrade material and the slab. An impermeable membrane should be placed over the gravel, and the membrane should be covered with 2 inches of sand to protect it during construction.

C.4. Retaining Walls

We recommend that restrained and unrestrained walls for cut slopes with a level surface or with a sloping surface flatter than 4:1 above the wall be designed to resist an equivalent fluid pressure of 50 and 35 pounds per cubic foot, respectively. Where the sloping surface above the wall is at a natural inclination of 1:1, restrained and unrestrained walls for cut slopes should be designed to resist an equivalent fluid pressure of 80 and 60 pounds per cubic foot, respectively. For walls with a sloping surface at an inclination between 4:1 and 1:1, a straight line interpolation between the indicated values may be used. The above pressures may be reduced by 5 pounds per cubic foot for the portions of the cut extended into bedrock. We recommend that restrained and unrestrained walls for fill slopes with a level surface or with a sloping surface flatter than 4:1 above the wall be designed to resist an equivalent fluid pressure of 60 and 40 pounds per cubic foot, respectively. Where the sloping surface is at an inclination of 2:1 restrained and unrestrained walls for fill slopes should be designed to resist an equivalent pressure of 80 and 60 pounds per cubic foot, respectively. If the designer determines that there are surcharge loads on the walls, the walls should be designed to resist an additional uniform pressure equivalent to one-half or one-third of the maximum anticipated surcharge load applied to the surface behind restrained or unrestrained walls, respectively. Where tiered retaining walls are proposed, plans should be submitted to us so that we may develop appropriate earth pressure values.

RECOMMENDATIONS
C. Structures
C.4. Retaining Walls (Continued)

The above pressures assume that sufficient drainage will be provided behind the walls to prevent the build-up of hydrostatic pressures from surface and subsurface water infiltration. Adequate drainage may be provided by a subdrain system consisting of a four-inch perforated hardened plastic pipe bedded in open-graded rock wrapped in an approved, polyester, non-woven geotextile. The permeable material placed behind the wall should be at least one foot in width and should extend to within one foot of finished grade. The upper one foot of backfill should consist of on-site, compacted, impervious soils. The subdrain pipe should e connected to a system of closed pipes that lead to a suitable discharge facility. Cleanouts should be provided at the upslope end of the perforated pipe and at the junction of the perforated and solid pipes.

Lined surface ditches should be provided behind all walls. These ditches which will collect runoff water from the slope, should be sloped to drain to catch basins leading to a solid pipe; the solid pipe should extend to a suitable discharge facility. The top of the walls should extend at least one foot above the ditches. All structural backfill placed behind the walls should be compacted to at least 90 percent relative compaction.

D. Plan Review

We recommend that our firm be provided the opportunity for a general review of geotechnical aspects of the final plans and specifications for this project in order that the geotechnical recommendations may be properly interpreted and implemented in the design and specifications. Specific items that we recommend our firm review and that the plans should contain, include, but are not limited to, the following:

1) General: A citation of this foundation investigation report (in the general notes.)

2) Foundations: Pier dimensions and depth of embedment, as well as footing dimensions and depth.

3) Slabs: Depth of scarification required, import fill depth, baserock or drainrock depth, vapor barrier and sand, as required.

4) Retaining walls: Foundation requirements (as noted in Item 3 above), wall drain system, impermeable plug above drain, surface ditch and freeboard, as needed.

5) Tiered Retaining Walls: Plans should be submitted in order to develop appropriate earth pressure reductions and increases due to the proximity of the walls to each other.

6) Drainage: Gradient away from structure, downspout collector pipes, surface or subdrain collector system, discharge location.

If our firm is not accorded the privilege of making the recommended review, we can assume no responsibility for misinterpretation of our recommendation.

RECOMMENDATIONS (Continued)

E. Construction Observation

The analysis and recommendations submitted in this report are based in part upon the data obtained from the 31 soil borings and 8 test pits. The nature and extent of variations across the site may not become evident until construction. If variations then become apparent, it will be necessary to re-evaluate the recommendations of this report.

We recommend that our firm be retained to provide geotechnical engineering services during the earthwork, drainage, and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and recommendations and to allow design changes in the event that subsurface conditions differ from that anticipated prior to the start of construction.

We also recommend that a representative of our firm observe the following aspects of the construction:

1) Site clearing and stripping;

2) Placement and compaction of any engineered fill;

3) Construction of the roadway subdrain;

4) Subgrade scarification and recompaction;

5) Evaluation of cut slopes to determine stable inclinations;

6) Excavation for lower levels of the residences;

7) Excavation of footing trenches;

8) Drilling of straight shaft pier holes;

9) Placement of compaction of sewer, storm drain, and utility trench backfill;

10) Installation of drainage systems behind retaining walls;

11) Construction of surface v-ditches;

12) Construction of surface drainage measures, including the placement of downspouts into discharge conduits; and

13) Finished grading and landscape grading around the perimeters of the structures.

In order to effectively accomplish these observations we recommend that a pre-construction meeting be held to explain our recommendations to the contractor and develop a mechanism for proper communications throughout the project. We also request that the client or his representative (the contractor) contact our firm at least 48 hours prior to the commencement of any of the items listed above. If our representative makes a site visit in response to a request from the client or his representative and it turns out that the visit was not necessary, our charges for the visit will still be applied.

RECOMMENDATIONS (Continued)

F. Wet Weather Construction

Although it is possible that construction can proceed during or immediately following the wet winter months, a number of geotechnical problems may occur which may increase costs and cause project delays. The water content of on-site soils may increase during the winter and rise significantly above optimum moisture content for compaction of subgrade or backfill materials. If this occurs, the contractor may be unable to achieve the recommended levels of compaction without using special measures and would likely have to:

1) Wait until the materials dry enough to become workable;

2) Dispose of the wet soils and import dry soils; or

3) Use lime or cement on the native materials to absorb water and achieve workability.

If trenches or excavations are open during winter rains, then caving of the trench or excavation walls may occur. Also, if the trenches fill with water during construction or if saturated materials are encountered at the anticipated bottom of the trenches or excavation, the trenches may need to be extended to greater depths to reach adequate bearing than would be necessary if dry weather construction took place.

We should also note that it has been our experience that increased clean-up costs will occur, and greater safety hazards will exist if the work proceeds during the wet winter months.

G. Future Performance

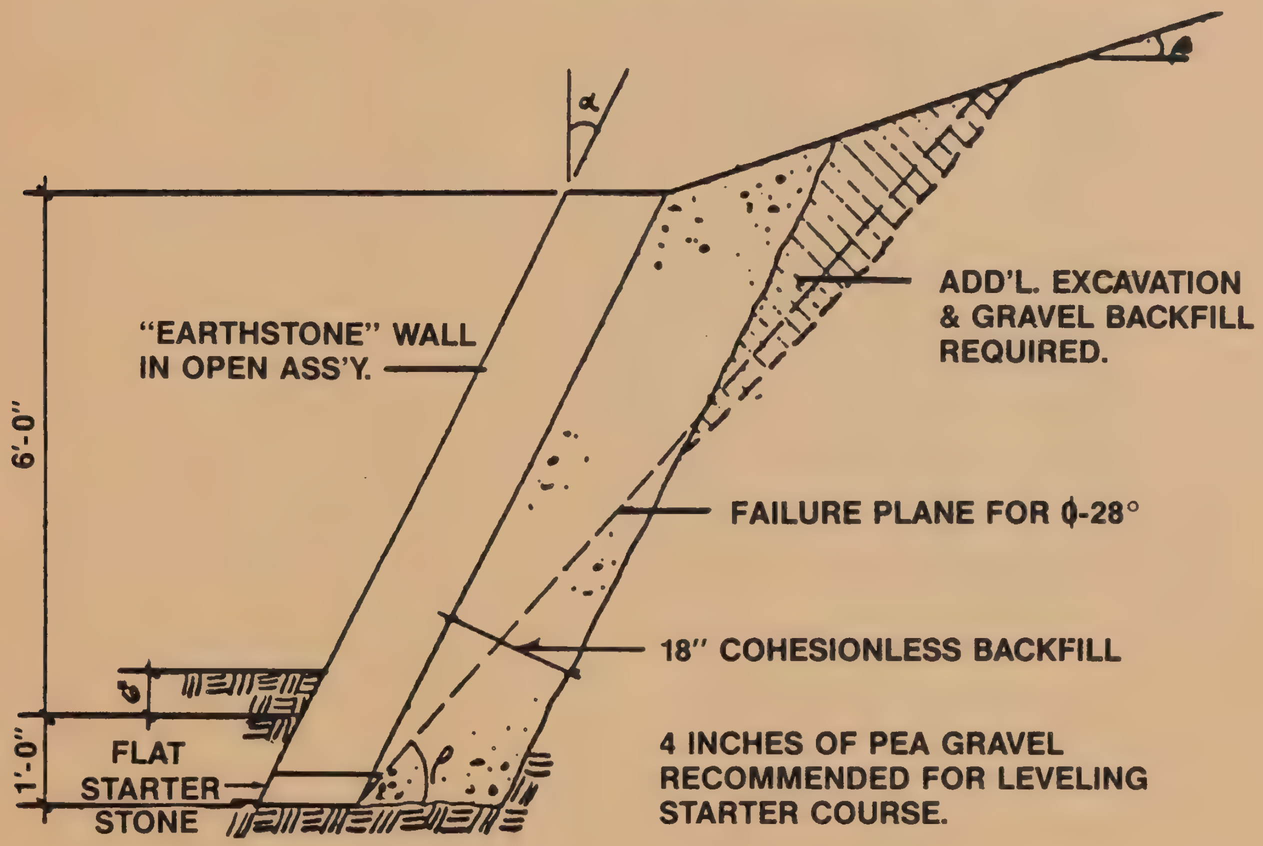
All people who own or occupy homes on hillsides should realize that landslide movements are always a possibility, although generally the likelihood is very low that such an event will actually occur. The probability that landsliding will occur is substantially reduced by the proper maintenance of drainage measures at the site (see detailed discussion in Appendix A). Therefore, the homeowners should recognize their responsibility for performing such maintenance. Consequently, we recommend that a copy of our report be provided to any future homeowners of the property if the homes are sold.

Even if proper maintenance is performed, landsliding may still occur during very heavy rains, breaks in water lines, or other severe environmental conditions. As noted earlier, the likelihood of landsliding is very low, but because the consequences of such an event could be costly, we recommend that landslide insurance for the property be obtained.

EarthStone™

EROSION CONTROL/RETAINING WALL SYSTEM

ENGINEERED WALL DESIGN
USING NO CONCRETE FOOTINGS



In this example, we have assumed an engineered backfill with an angle of internal friction of 35 degrees. **You will notice that there is no footing**, and the depth of embedment has been reduced to 1'-6".

COMPLETE ENGINEERING REPORT AVAILABLE UPON REQUEST

Yours very truly,
ENGLEKIRK & HART
Consulting Engineers, Inc.

Russell Tanouye

Russell Tanouye, S.E.
Vice President

Exclusively manufactured by

HOKANSON **BUILDING BLOCK CO.**
4751 Power Inn Road
Sacramento, CA 95826
(916) 452-5233
FAX (916) 452-5233

EarthStone™ Wall System

DEFINITION

The EarthStone Wall System is designed to use EarthStone, a specially engineered and tested concrete block unit, which, when laid up in normal running or common bond eliminates the need for mortar, grout or reinforcement in the wall stem.

PURPOSE

The EarthStone Wall System will minimize labor costs, accelerate completion time, provide superior wall quality, eliminate unsightly shrinkage cracking, and enhance wall aesthetics and landscaping.

OBJECTIVE

The EarthStone Wall System will provide the construction industry with a new and innovative product, offering significant cost savings, reducing the need for skilled labor and special equipment. It should result in an enthusiastic acceptance in the marketplace and yield a successful and profitable business operation.

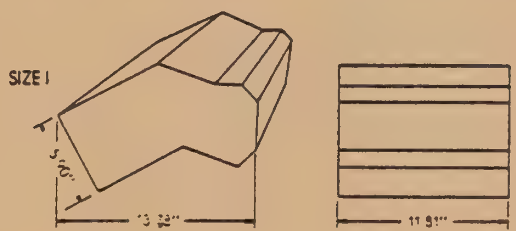
GENERAL DESCRIPTION

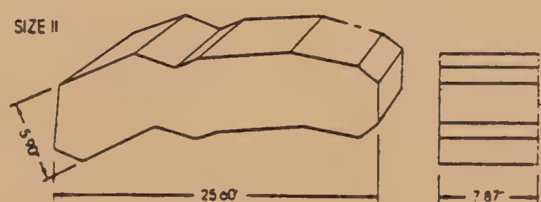
CHARACTERISTICS

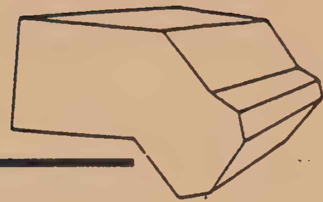
MATERIAL - EarthStones are produced under close quality control requirements with a high quality concrete mixture. The compressive strength of the finished product exceeds 5000 psi.

WEIGHT & DIMENSIONS - Size I EarthStones weigh 66 pounds and are approximately 12 inches in length, 14 inches in width, and 6 inches in depth. Half and quarter size EarthStones are also available. Size II EarthStones weigh 90 pounds and are approximately 8 inches in length, 25.60 inches in width, and 6 inches in depth.

COLOR - EarthStones come in two standard colors, earth gray and

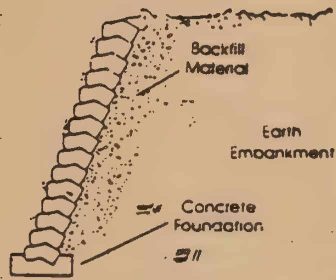






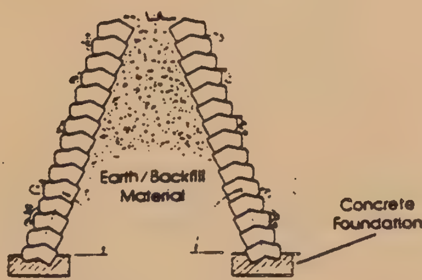
EarthStone APPLICATIONS

GRAVITY RETAINING WALLS - EarthStones offer an ideal substitute for conventional reinforced concrete or masonry walls. The EarthStone Wall System has demonstrated the capability to safely withstand tremendous load pressures. Some applications of the EarthStone Wall System are: slope stabilization and erosion control along highways and roadsides, grade changes in residential developments, garden walls, noise abatement barriers, etc.



Retaining Wall

NOISE ABATEMENT - SOUND SUPPRESSION BARRIERS - The EarthStone Wall System may easily be utilized as an economical and attractive noise suppression wall. Two EarthStone walls must be constructed to form an inverted V-shape with compacted earth fill in between. Examples of EarthStones used as a noise abatement barrier include walls adjacent to railroad tracks, surrounding walls for residential communities alongside highways and walls adding privacy to residential lots.

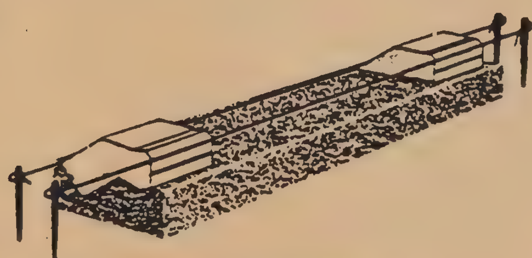


Noise Abatement Privacy Wall

CONSTRUCTION OF THE EarthStone WALL SYSTEM

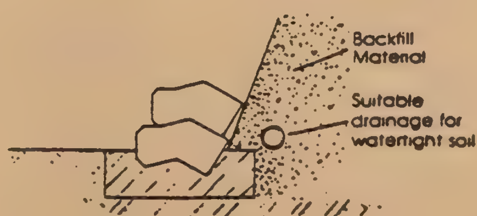
I. GROUND PREPARATION

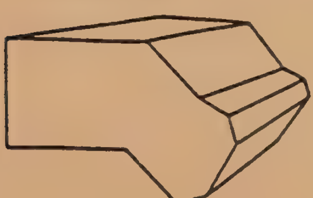
FOUNDATION - Upon conpletion of the excavation and formwork, the EarthStone wall foundation should be placed in a continuous strip using good quality concrete and steel reinforcement whenever it is applicable. The dimensions of the foundation should be determined by the design engineer of record. Frost-free foundations must be considered whenever applicable.



Concrete Foundation

DRAINAGE - A buildup of hydrostatic pressure behind the walls shall not be permitted. For conditions of a water tight or poorly draining soil, suitable drainage must be provided. This may be accomplished by using perforated drainage pipes and granulated backfill of good quality.

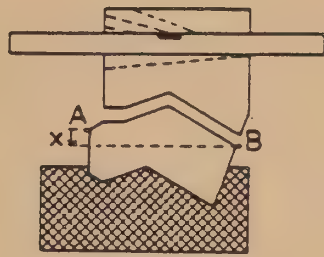




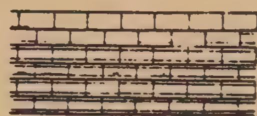
HOKANSON BUILDING BLOCK CO.
4751 Power Inn Road Sacramento, California 95826
Phone 452-5233

II. WALL CONSTRUCTION PROCEDURE

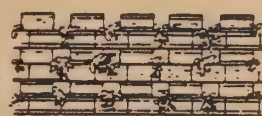
BOTTOM COURSE - Blocks in the bottom course of an EarthStone wall are always placed in closed assembly in the wet concrete of the footing. The wall slope shall be determined prior to construction and the bottom course accurately set accordingly in the concrete footing. With the aid of an EarthStone Wall Template, provided by the manufacturer, the proper angle of the bottom EarthStone course will be insured.



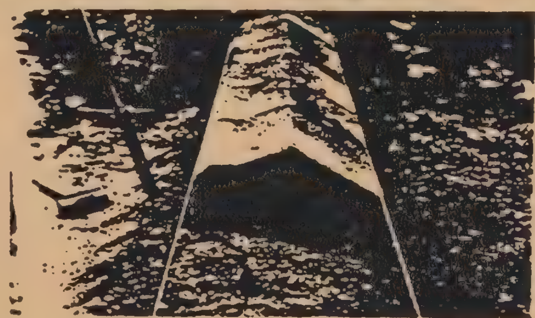
Template


Closed Assembly – 22/11 Ft²


Open Assembly – 15/11 Ft²


Alternating Assembly – 18.5/11 Ft²

EarthStone WALL HEIGHT - After completion of the bottom course, and after the foundation concrete has hardened for a minimum of three days, subsequent courses may be laid on top of and adjacent to each other: in closed assembly (22 EarthStones approx. every 11 sq. feet), or in open assembly (15 EarthStones approx. every 11 sq. feet). For purposes of preliminary design and estimating, heights for an EarthStone Wall System may be taken from curves 1, 2, 3, or 4. Actual design conditions will determine the final maximum wall height. Higher walls are possible with special tie-back bracing anchors. Detailed information for such walls should be requested from the EarthStone manufacturer. It is usually recommended that the top course of EarthStones be in closed assembly and mortared in place for reasons of safety only.


Bottom Course

BACKFILL - During construction of an EarthStone Wall System, backfilling material should be placed behind the structure using a vibrating compactor. The backfill shall be placed in 12 inch deep layers. All backfill must be of good granular, noncohesive material. The minimum thickness of the blanket of cohesionless backfill behind the wall is recommended to be: 18 inches thick for walls up to 6 feet high, 30 inches thick for walls up to 13 feet high. For wall heights greater that 13 feet, a specific backfill design is required based on recommendations of a soils engineer.


Second Course

ALTERNATIVE EARTH RETAINING SYSTEMS IN CALIFORNIA HIGHWAY PRACTICE

June 1986

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2

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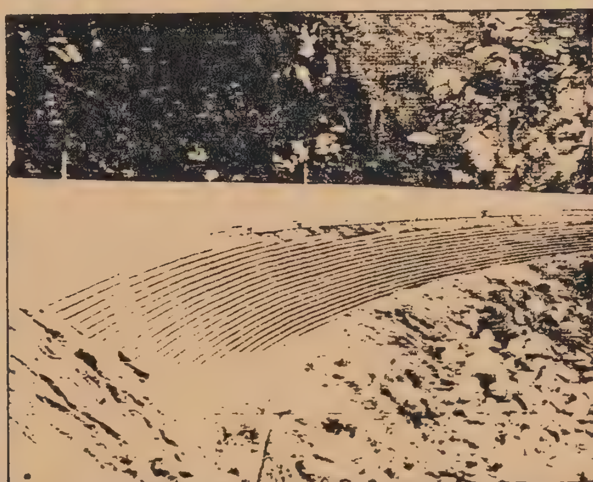

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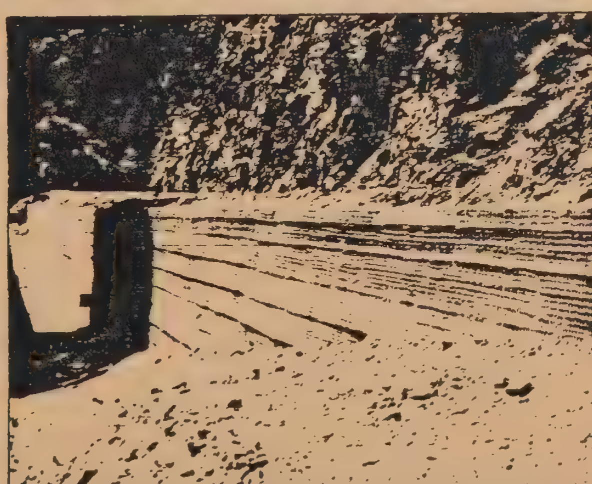

6

1 Mechanically Stabilized Embankment (MSE) 2 CALTRANS T-A-T. Tire Anchored Timber Wall
3 CALTRANS Salvaged Guardrail Wall 4. Earthstone Wall 5 Tensar Embankment 6 Hilfiker Welded Wire Wall

PARTIAL SUMMARY OF CONSTRUCTED ALTERNATIVE EARTH RETAINING SYSTEMS

Reinforced Earth (RE) Wall

*Los Angeles, L.A. Co.	Hwy 39	1972
*Dunsmuir, Siskiyou Co.	I-5	1976

Highway 39 was the first Reinforced Earth Wall constructed in the United States. Maximum height is 55 feet. This project utilized steel facing elements and was designed to stabilize a slide in steep terrain. The wall performed excellently. Other slides in non-stabilized areas eventually caused closure of the highway.

Mechanically Stabilized Embankment (MSE)

*Dunsmuir, Siskiyou Co.	I-5	1976
*Delhi, Merced Co. (wood facing)	Hwy 99	1979
*Baxter, Placer Co.	I-80	1982

MSE was developed by CALTRANS in 1973. The basic modification used bar-mats as soil reinforcement to provide additional pullout resistance over the original smooth steel strips used in Reinforced Earth. The increased pullout resistance (by a factor of 6) permitted the use of local low quality material as backfill. The first full-scale experimental MSE was constructed in 1976 along I-5 at Dunsmuir and the latest successful MSE was completed on I-80 at Baxter in 1982.

Caltrans Tire Anchored Timber Wall (TAT)

*Mono Co.	Hwy 203	1981
Santa Cruz Co.	Hwy 1	1983
Sausalito, Marin Co.	Hwy 101	1983
San Mateo Co.	Hwy 92	1984
San Mateo Co.	Hwy 114	1984
Marin Co.	Hwy 101	1985

The three-level wall in Sausalito used salvaged automobile tire sidewalls with steel anchor rods as reinforcement to stabilize a hillside downslope from a state highway. In addition to a possible loss of the roadway, homes were in the potential slide area. Therefore, this site demanded critical and immediate attention. Cut-off drainage trenches were used to keep the hill as free of groundwater as possible. New and salvaged railroad ties were used as the facing on the wall; the treated timber is expected to have a 50 year life.

CALTRANS/Salvaged Guardrail Wall

*Thousand Oaks, Ventura Co.	Hwy 101	1981

This wall was constructed to accomplish a highway widening. Salvaged and new guardrails were used as the facing members. Low quality backfill can be used with these walls.

Hilfiker Welded Wire Wall

Blue Lakes, Lake Co.	Hwy 20	1982
Helena, Trinity Co.	Hwy 299	1983

Galvanized welded wire fabric is used for both the facing and internal reinforcement in this wall system. The facing can be left exposed with vegetation eventually growing, or gunited. Maximum wall height was 22 feet at Blue Lakes project on Highway 20.

Earthstone Wall

Bakersfield, Kern Co.	Hwy 178	1984

Basically a gravity wall system. The wall is placed on a concrete leveling pad. Free-draining material must be placed immediately behind the wall facing and allowed to drain under the pad, although some drainage can occur through wall seams. The wall facing can be exposed to stream flow with no ill effects. Fabric reinforced backfill needs to be used in conjunction with these blocks to provide permanent backfill stability.

Fabric Wall

Plumas Co.	Hwy 70	1983

Woven or non-woven fabrics can be used to form a reinforced soil mass. To prevent most fabric UV deterioration, walls are generally coated with gunite or asphalt emulsion.

Tensar Wall

*La Honda, San Mateo Co.	Hwy 84	1985

Tensar, a net-like (geogrid) product from the Netlon Company, provides internal reinforcement of the soil mass in much the same fashion as MSE. Some geogrids are made of polymer-type materials which are extremely stable in highly corrosive environments. Facing can be seeded or covered with gunite, depending on needs and/or UV resistance.

NOTICE

The contents of this brochure reflect the views of the Office of Transportation Laboratory which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation or endorsement.

*Research reports available upon request.

Study provided by Geotechnical Branch ▪ Transportation Laboratory ▪ 5900 Folsom Blvd ▪ Sacramento CA 95819 ▪ (916) 739-2364

COMPARISON OF ALTERNATIVES

Type of Wall	Cost Saving Potential	Aesthetics	Ability to Tolerate Settlement	Require Quality Backfill	Earthquake Resistance	Facing Material	Require Additional Field Construction Time	Maximum Reasonable Wall ht., ft (vert. wall)	Corrosion Resistance	Soil Reinforcement Type
R.C. Cantilever Wall (spread foundation)	F	G	P	YES	E-G	concrete	NO	30	E	—
R.C. Cantilever Wall (pile foundation)	F	G	P	YES	E-G	concrete	YES	30	E	—
Permanent Tieback	P	G-F	P	NO	G-F	wood concrete	YES	40	G	steel
Bin or Crib Wall	G	F	F	YES	G	metal concrete	NO	40	E-G	—
CALTRANS MSE*	E-G	E	G	NO	E	wood concrete	NO	50	F	steel
Reinforced Earth	E-G	E	G	YES	E	concrete	NO	80	G-F	steel
Hilfiker RSE, VSL	E-G	E	G	NO	E	concrete	NO	50	F	steel
Welded Wire Wall	E	P	E	NO	E	wire	NO	30	F-P	steel
CALTRANS T-A-T**	E-G	E	G	NO	E-G	timber	NO	30	G	steel
CALTRANS Salvage Guardrail Wall	E-G	G-F	G	NO	E-G	metal concrete	NO	30	G	steel
Double Wall	E	G-F	F	NO	P	concrete	NO	20	E	—
Earthstone Loffelstein***	E	E-G	G-F	YES	P	concrete	NO	—	E	fabric (optional)
Gabion	G	P	G	YES	G	wire	NO	12	G-F	steel
Fabric Wall	E	P	E	NO	E	gunite tar emulsion	NO	—	E	geo-textile
Tensar Wall	E-G	F-P	E	NO	E	concrete plastic	NO	—	E	plastic

*Mechanically Stabilized Earth   **Tire Anchored Timber Wall   ***G if Backfill is Fabric Reinforced

Rate: E = Excellent G = Good F = Fair P = Poor   Limitation: Yes No

COMPARISON OF 1985 CONSTRUCTION COSTS

($ per square foot of wall facing)

Height of Wall (ft.)	10′	20′	30′
R.C. Cantilever Wall (spread foundation)	$26	$37	$ 50
R.C. Cantilever Wall (pile foundation)	46	58	72
Permanent Tieback	65	90	120
Bin or Crib Wall	23	32	40
CALTRANS MSE (with low quality backfill)*	23	26	33
Reinforced Earth	25	28	35
Hilfiker RSE, VSL	25	28	35
Welded Wire Wall	13	15	18
CALTRANS T-A-T**	24	26	28
CALTRANS Salvage Guardrail Wall	15	17	19
Double Wall	14	17	22
Earthstone***	8	10	14
Gabion	25	33	55
Fabric Wall	10	12	14
Tensar Wall	17	20	25
Loffelstein***	12	14	18

CALCULATIONS OF ESTIMATED ENERGY INPUTS - BEACONSFIELD RESIDENTIAL DEVELOPMENT, CITY OF OAKLAND

Because detailed, comprehensive data are not readily available for evaluating energy inputs for new developments in the City of Oakland, the evaluation guidelines of Contra Costa County* have been used for this analysis. This method involves the assumption that typical Contra Costa data are similar to actual required inputs in the City of Oakland for the same types of construction activities.

1. STREET AND UTILITY DEVELOPMENT. Site development inputs per linear foot of street length = 63 therms for "single-family conventional" construction (Contra Costa study; Table 1.5):

   530 lin. ft. x 63 therms/ft. = 33,390 therms

2. RESIDENTIAL CONSTRUCTION. (Calculated for maximum site development of 20 units.) At 14,511 therms/conventional unit (Table 1.5):

   14,511 therms/unit x 20 units = 290,220 therms

3. UPKEEP OF STREETS AND UTILITIES. For a 20-year period, at 1,331 therms/ conventional unit (Table 1.5):

   1,331 therms/unit x 20 units = 26,620 therms

4. RESIDENTIAL OPERATION. Heating, cooling, lighting, and appliance operation over a 20-year period, including indirect energy required to produce and deliver household energy. (Contra Costa County energy-input factor is for El Cerrito area, which has heating/cooling energy use most similar to Oakland.)

   At 38,565 therms/unit/20 years (Table 1.6), reduced by a factor of 0.9, to reflect phased residential construction:

   38,565 therms/unit x 20 units x 0.9 = 694,170 therms

5. MAJOR EARTHWORK. Estimated construction-equipment fuel-use input not included in calculations above (excavation, filling, and compaction in project-site canyon floor). Assume fuel-use factor of 0.20 gallons/cubic yard of material (Table A-18):

   0.20 gal./cyd x 12,000 cyd = 2,400 gal. x 1.38 therms/gal. = 3,312 therms

* Interactive Resources, Inc.; May, 1976; Energy Conservation: Guidelines for Evaluating New Development in Contra Costa County, California (two volumes)

SUMMARY OF ESTIMATED ENERGY INPUTS FOR BEACONSFIELD RESIDENTIAL DEVELOPMENT, CITY OF OAKLAND*

	BTU x 100,000 (therms)**	% of total
INITIAL ENERGY INPUTS		
Street and utility construction	33,390	3.2
Residential construction	290,220	27.7
Major earthwork	3,312	0.3
LONG-TERM, NON-TRANSPORTATION IMPUTS, 20-YEAR PERIOD		
Residential Operation	694,170	66.3
Upkeep of streets and utilities	26,620	2.5
TOTAL ESTIMATED 20-YEAR ENERGY INPUT	1,047,712	100.0

* Based on total of 20 project-site units.

** One therm = 100,000 BTU. A BTU (British Thermal Unit) is the amount of heat required to raise the temperature of one pound of water by one degree F.

POSSIBLE ENERGY CONSERVATION METHODS FOR PROPOSED BEACONSFIELD PROJECT, CITY OF OAKLAND

1. Provide solar systems for heating water. (The project has some solar-use limitations due to the canyon-floor locations of building sites.)

2. Install energy-efficient appliances.

3. Insulate hot-water pipes and (solar system) back-up water heaters.

4. Design units with passive solar systems:

   a. Limited window areas on west and east building exposures.

   b. Larger glass areas on south exposures, to optimize solar-radiation warmth in winter.

   c. Roof overhangs and wing-walls to shade windows and exterior walls in the summer and expose them to the sun in winter.

   d. Interior heat-sinks (such as masonry- or stone-faced walls or partitions) which will absorb southern-exposure solar radiation during winter days and reradiate it during evenings.

5. Locate windows to take advantage of natural circulation for summer cooling.

6. Install energy-efficient Heatilator-type fireplaces, with approved dampers, and provide for the drawing of fireplace combustion air from crawl spaces or other voids rather than from rooms.

7. Install flourescent lighting fixtures where possible rather than high-energy-use incandescent fixtures.

8. Where practical, install energy-efficient skylights to increase natural interior light and reduce dependence on artifical light.

9. Install energy-efficient windows and glass doors.

10. Provide insulation and weatherstriping in excess of current minimum standards.

11. Where possible, design landscaping to include deciduous trees at strategic locations where they will shade exterior walls and windows in summer and expose them to solar radiation in winter (and to reduce summer heat build-up on exterior paved areas).

12. Install low-flow shower heads and water-efficient toilets. (Production of potable water requires substantial use of energy.)

13. Design landscaping and irrigation systems to minimize water consumption.

14. Design dwelling units to make use of clothes-dryer exhaust for supplemental heating.

DRAINAGE AREA MAP
1" = 300'
(REDUCED)

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H-2

David J. F[illegible]
No. 34852
Exp 9.30.91
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CIVIL ENGINEERS LAND SURVEYORS
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BEACONSFIELD PLACE
OAKLAND

HYDROLOGY

SEE DRAINAGE AREA MAP

$AREA_1$ = 75 Acres

RUNOFF COEFICIENT C = 0.5 RESIDENTIAL (CITY OF OAKLAND)

RAINFALL INTENSITY (i)

INLET TIME = 10 MIN

DRAINAGE BASIN TIME = $\frac{3600 \text{ FT}}{60 \text{ S/M} \times 7 \text{ FT/S}}$ = 8.5 MIN (OVERLAND FLOW DISTANCE)

TIME OF CONCENTRATION

T_c = 10 + 8.5 MIN

FROM CITY CHART $i_{15 \text{ YEAR}}$ = 1.63

Q = 75 × 0.5 × 1.63 = 61 CFS AT HEADWALL

$AREA_2$ = 10.5 Acres C = 0.5

TIME OF PIPE FLOW = $\frac{600 \text{ FT}}{60 \text{ S/M} \times 15 \text{ FT/S}}$ = 0.7 MIN

T_c = 18.5 + 0.7 = 19.2

i_{15} = 1.60

Q = 10.5 × 0.5 × 1.6 = 8.4 CFS

Q_{TOTAL} = 61 + 8.4 = 69.4 CFS @ 1ST EXISTING INLET

AREA 2A (A PORTION OF AREA 2 COLLECTED IN NEW INLET ACROSS BEACONSFIELD & PIPED TO EX. INLET)
= 6 AC
C = 0.5 i = 1.6

Q = 6 × 0.5 × 1.6 = 4.8 CFS

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BEACONSFIELD PLACE
OAKLAND

HYDRAULICS

SEE HYDRAULIC PROFILE

USING MANNING FORMULA, FOR R.C.P. COEFICIENT OF FRICTION n = 0.013

$Q = A \frac{1.5}{n} R^{2/3} S^{1/2}$

SOLVING FOR Q_{MAX} = 69 CFS, FOR 30" RCP

SLOPE REQUIRED = 2.8%

ALL 30" PIPE SLOPES EXISTING AND PROPOSED ARE > 2.8%

THEREFORE THE HYDRAULIC GRADE REMAINS WITHIN THE PIPES

ASSUME FREE OUTLET AT END OF KESWICK, THEN INITIAL HYDRAULIC GRADE IS OBTAINED BY SOLVING FOR DEPTH.

OUTLET TO EX MH1:

Q = 69 S = 3% D = 2.0 FT V = 16 F/S

HEAD LOSS MH1 = $\frac{(16-26)^2}{2g}$ = 1.6 FT

EX. MH 1 TO EX MH 2:

Q = 69 S = 10% D = 1.3 FT V = 26 F/S

H.L. MH2 = $\frac{(26-25)}{2g} \approx 0$

EX MH 2 TO EX INLET 3:

Q = 69 S = 9% D = 1.3 FT V = 25 F/S

H.L. @ INLET = $.3 \frac{25^2}{2g}$ = 2.9 FT

EX INLET 3 TO NEW MH 4:

Q = 61 S = 12% D = 1.1 FT V = 26 F/S

HL @ MH 4 = $\frac{(26-17)^2}{2g}$ = 1.3 FT

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H-3

HYDRAULICS CONT.

NEW MH 4 TO NEW MH 5:

$Q = 61$ $S = 3.5\%$ $D = 1.6$ FT $V = 17$ FT/s

$$H.L. @ MH5 = \frac{(17-16)^2}{2g} \approx 0$$

NEW MH5 TO HEAD WALL:

$Q = 61$ $S = 3\%$ $D = 2.0$ FT $V = 16$ FT/s

HEAD LOSS @ HEADWALL:

$$= 0.5 \left(\frac{16^2}{2g}\right) = 2.0 \text{ FT}$$

12" S.D. ACROSS BEACONSFIELD TO INTERSECT AT OR ABOVE HYDRAULIC GRADE @ INLET 3.

INLET 3 TO INLET 3A:

$Q = 4.8$ $S = 2\%$ $D = 0.8$ FT $V = 7$ FT/s

FOR GRAPHICAL REPRESENTATION OF HYDRAULIC GRADE SEE HYDRAULIC PROFILE

CALCULATIONS OF CONTRIBUTION OF DEVELOPED AND UNDEVELOPED PROJECT SITE TO OVERALL FLOW THROUGH SITE

E. Franzen, Civil Engineer
August, 1988

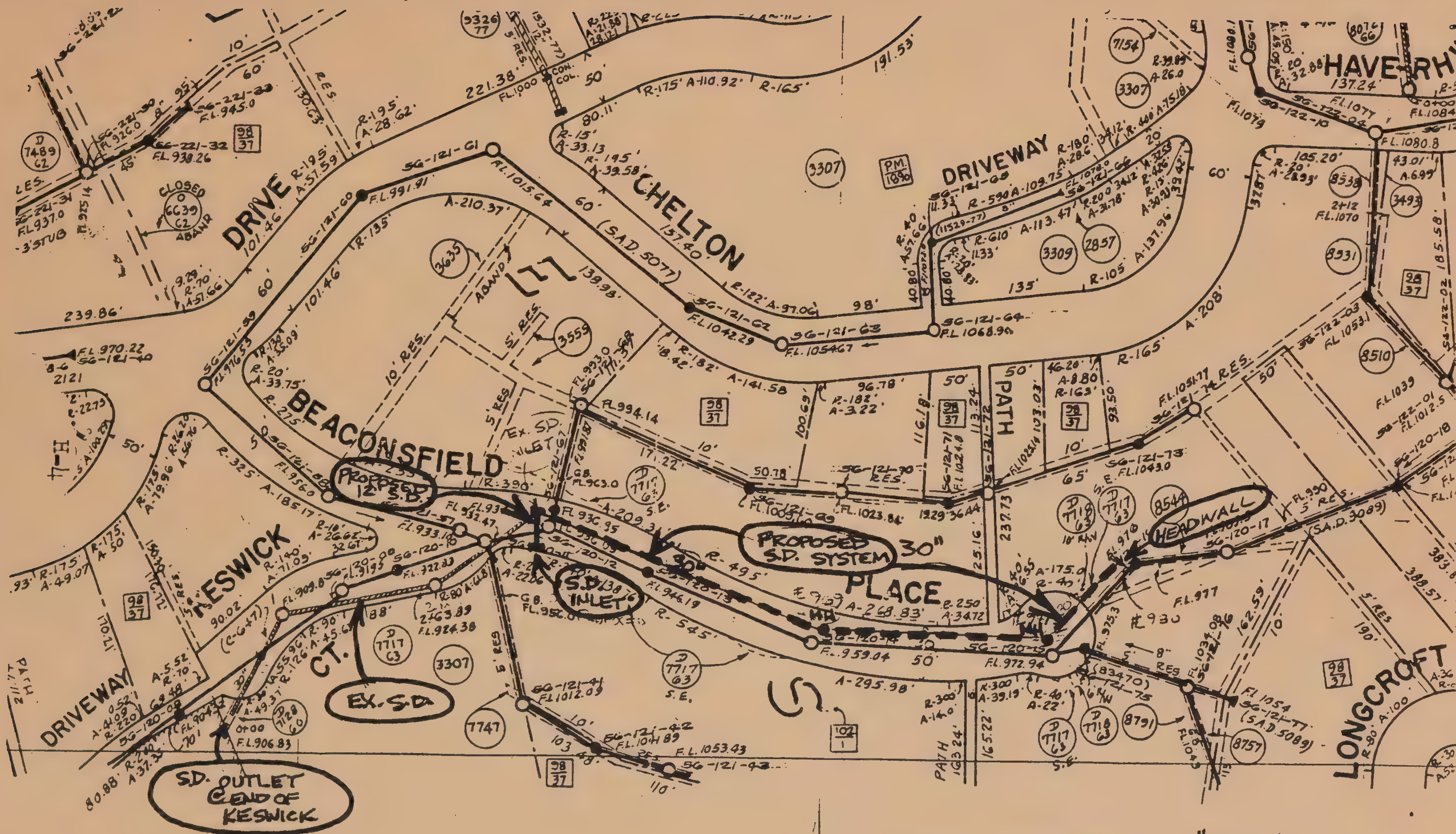
Calculations based on flow and drainage area Moran Engineering calculations of August 19, 1988.

- Total acres of drainage area = 75
- Project-site drainage area, including off-site, upslope areas = 10.5 acres.
- Project site = 4.5 acres of 10.5 acres.
- Hard-surface areas shown on plans + estimated area for three additional lots = 0.9 acre.
- Proposed street pavement = 0.4 acre.
- 15-year storm = 1.6" rainfall/hour (per Moran/City of Oakland).

1.3 acres hard-surface x 90% runoff x 1.6"/hr. rainfall =
1.9 cfs (runoff with development)

1.3 acres x 30% runoff x 1.6" rainfall =
0.6 cfs (runoff without development)

Therefore, increase = 1.3 cfs out of total of 69 cfs at existing inlet
= 2% of total flow off of site



STORM DRAINAGE SYSTEM MAP

1"=100' (REDUCED)

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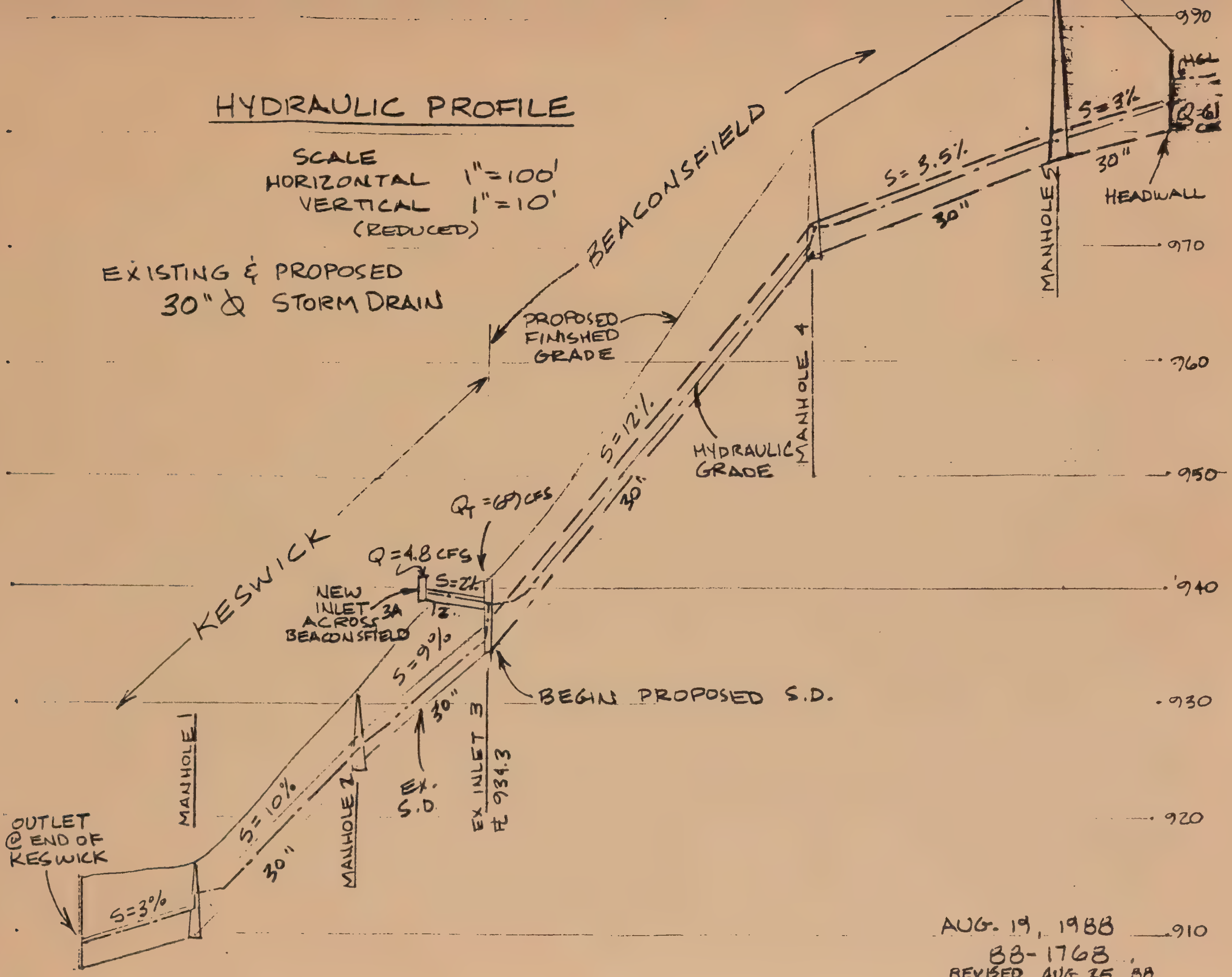

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H-5

Noise Standards, Terminology, Instrumentation,

1. HUD/FHA Standards

The current Housing and Urban Development standard, CFR Title 24, which became effective August 13, 1979, identifies an exterior noise goal of 55 day-night sound level (L_{dn}). However, a site for new residential construction is considered acceptable if the exterior L_{dn} is 65 dB or below.

For interior noise levels, the HUD/FHA standards establish a limit of 45 dB L_{dn}.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Community Noise Analyzer. Some of the statistical levels used to describe community noise are defined as follows:

L_{10} - The noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time, representing an "average" sound level.

L_{90} - The noise level exceeded for 90% of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent level is that level of a steady noise having the same energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-average value of sound energy or sound pressure squared. The L_{eq} is the noise descriptor used to calculate the L_{dn}.

B. Day-Night Sound Level (L_{dn})

Noise levels utilized in the standards are described in terms of the day-night sound level (L_{dn}). The L_{dn} rating is determined by the cumulative noise exposures occurring over a 24 hour day in terms of A-weighted sound energy. The 24 hour day is divided into two subperiods for the L_{dn} index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The L_{dn} is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$L_{dn} = [(L_d + 10 \log_{10} 15) \mathbin{\&} (L_n + 10 + 10 \log_{10} 9)] - 10 \log_{10} 24$$

where:

$L_d = L_{eq}$ for the daytime (7:00 a.m. to 10:00 p.m.)
$L_n = L_{eq}$ for the nighttime (10:00 p.m. to 7:00 a.m.)
24 indicates the 24 hour period
& denotes decibel addition

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighting network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of a Gen Rad Company Community Noise Analyzer, which provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the analyzer was provided by a microphone extended to a height of 5 ft. above the ground. The "A" weighting network and the "Fast" response setting of the analyzer were used in conformance with the applicable standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.